ICOM

SERVICE MANUAL

VHF TRANSCEIVER

IC-F33GT
IC-F33GS
IC-F34GT
IC-F34GS

S-14113IZ-C1-①
Apr. 2007

Icom Inc.

INTRODUCTION

This service manual describes the latest service information for the **IC-F33GT/GS** and **IC-F34GT/GS** VHF TRANSCEIVER at the time of publication.

MODEL	VERSION	CHANNEL SPACING	FREQUENCY RANGE
IC-F33GT (10-key)	USA-01	15.0/30.0 kHz	136–174 MHz
	USA-02		
	GEN-01	12.5/25.0 kHz	
	CHN-01		
IC-F34GT (10-key)	EUR-01	12.5/20.0/25.0 kHz	
IC-F33GS (4-key)	USA-01	15.0/30.0 kHz	
	USA-02		
	GEN-01	12.5/25.0 kHz	
	CHN-01		
IC-F34GS (4-key)	EUR-01	12.5/20.0/25.0 kHz	
	SWE-07		
	SWE-09		
	NOR-08		

To upgrade quality, any electrical or mechanical parts and internal circuits are subject to change without notice or obligation.



CAUTION

NEVER connect the transceiver to an AC outlet or to a DC power supply that uses more than 8 V. This will ruin the transceiver.

DO NOT expose the transceiver to rain, snow or any liquids.

DO NOT reverse the polarities of the power supply when connecting the transceiver.

DO NOT apply an RF signal of more than 20 dBm (100 mW) to the antenna connector. This could damage the transceiver's front-end.

ORDERING PARTS

Be sure to include the following four points when ordering replacement parts:

1. 10-digit Icom parts numbers
2. Component name
3. Equipment model name and unit name
4. Quantity required

<ORDER EXAMPLE>

1110003491	S.IC	TA31136FNG	IC-F33GT	MAIN UNIT	5 pieces
8820001210	Screw	2438 screw	IC-F33GT	Top cover	10 pieces

Addresses are provided on the inside back cover for your convenience.

REPAIR NOTES

1. Make sure the problem is internal before disassembling the transceiver.
2. **DO NOT** open the transceiver until the transceiver is disconnected from its power source.
3. **DO NOT** force any of the variable components. Turn them slowly and smoothly.
4. **DO NOT** short any circuits or electronic parts. An insulated tuning tool **MUST** be used for all adjustments.
5. **DO NOT** keep power ON for a long time when the transceiver is defective.
6. **DO NOT** transmit power into a Standard Signal Generator or a Sweep Generator.
7. **ALWAYS** connect a 50 dB to 60 dB attenuator between the transceiver and a Deviation Meter or Spectrum Analyzer when using such test equipment.
8. **READ** the instructions of test equipment throughly before connecting a test equipment to the transceiver.

CONTENTS

SECTION 1 SPECIFICATIONS

■ GENERAL

- Frequency coverage : 136.000–174.000 MHz
- Mode : FM
- Type of emission :

VERSION	WIDE	MIDDLE	NARROW
[USA], [GEN]	16K0F3E (25.0 kHz)	N/A	11K0F3E (12.5 kHz)
[EUR]		14K0F3E (20.0 kHz)	8K50F3E (12.5 kHz)

- Number of conventional channels : 256 ch, 16 banks
- Antenna impedance : 50 Ω (nominal)
- Operating temperature range : –30˚C to +60˚C (–22˚F to +140˚F) [USA], [GEN]
  –25˚C to +55˚C [EUR]
- Power supply requirement : 7.2 V DC nominal (negative ground)
- Current drain (at 7.2 V DC) :

RECEIVING		TRANSMITTING	
Stand-by	Max. audio	High (5 W)	Low (1 W)
85 mA	300 mA	1.5 A	0.7 A

- Dimensions (projections not included) : 53.0(W) × 120.0(H) × 32.5(D) mm; 2 3⁄32(W) × 4 23⁄32(H) × 1 9⁄32(D) in
- Weight (with BP-231+FA-SC55V-1) : 285 g; 10 1⁄16 oz (Approx.)

■ TRANSMITTER

- Output power (at 7.2 V DC) : High: 5 W, Low: 1 W
- Modulation : Variable reactance frequency modulation
- Maximum permissible deviation : ±5.0 kHz (Wide), ±4.0 kHz (Middle), ±2.5 kHz (Narrow)
- Frequency error : ±2.5 ppm
- Spurious emissions : 80 dB (typical) [USA], [GEN]
  0.25 μW (≤1 GHz), 1.0 μW (≥1 GHz) [EUR]
- Adjacent channel power : 70 dB min (80 dB typical) for Wide and Middle
  60 dB min (70 dB typical) for Narrow
- Audio harmonic distortion : 3% typical (Mod. 1 kHz, 40% deviation)
- Limiting charact of modulator : 60–100% of maximum deviation
- Microphone impedance : 2.2 kΩ

■ RECEIVER

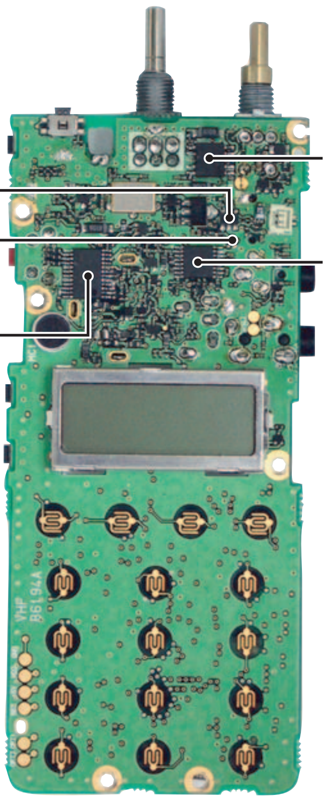
- Receive system : Double conversion superheterodyne system
- Intermediate frequencies : 1st IF: 46.35 MHz, 2nd IF: 450 kHz
- Sensitivity : 0.25 μV (–119 dBm) typical at 12 dB SINAD [USA], [GEN]
  –4 dBμV (–111 dBm) emf typical at 20 dB SINAD [EUR]
- Adjacent channel selectivity : 70 dB min (75 dB typical) for Wide and Middle
  60 dB min (65 dB typical) for Narrow
- Spurious response : 70 dB
- Intermodulation rejection ratio : 70 dB min (74 dB typical) [USA], [GEN]
  65 dB min (67 dB typical) [EUR]
- Audio output power : 0.5 W typical at 5% distortion with an 8 Ω load
- Squelch sensitivity (at threshold) : 0.25 μV typical
- Output impedance (Audio) : 8 Ω

Specifications are measured in accordance with EIA-152-C/204D, TIA-603 or EN 300 086.
All stated specifications are subject to change without notice or obligation.

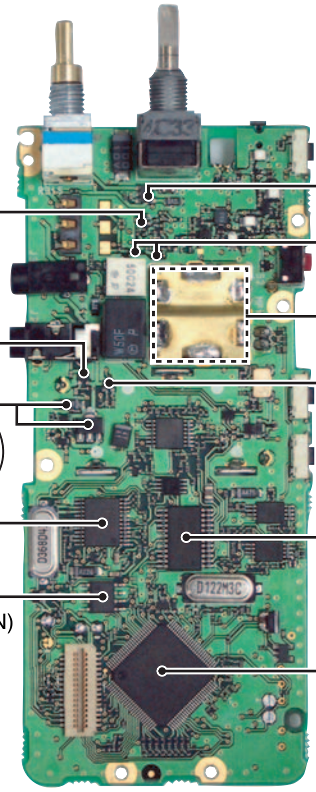
SECTION 2 INSIDE VIEWS

• MAIN UNIT

TOP VIEW

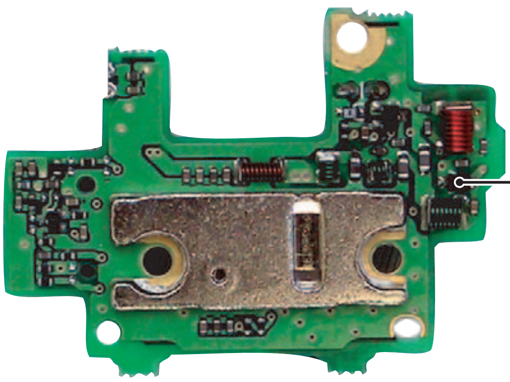


BOTTOM VIEW

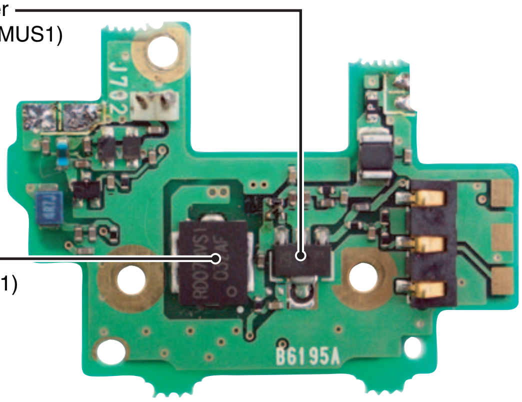


• PA UNIT

TOP VIEW



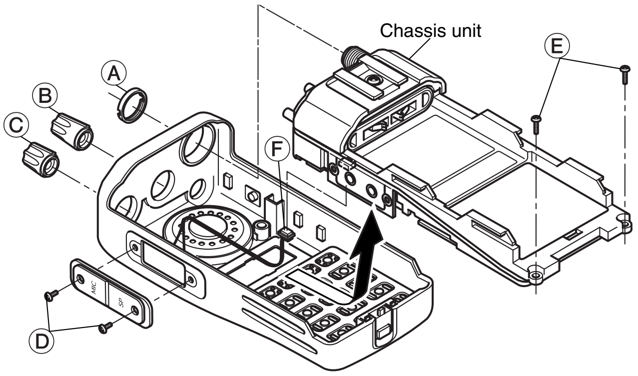
BOTTOM VIEW



SECTION 3 DISASSEMBLY INSTRUCTION

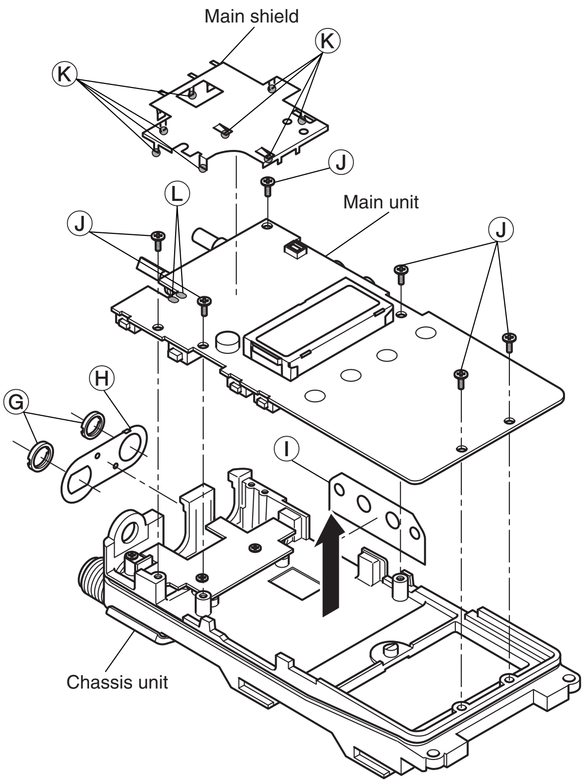
• REMOVING THE CHASSIS UNIT

① Unscrew 1 nut Ⓐ, and remove 2 knobs Ⓑ, Ⓒ.
② Unscrew 2 screws Ⓓ.
③ Unscrew 2 screws Ⓔ.
④ Take off the chassis unit in the direction of the arrow.
⑤ Unplug the connector Ⓕ from the chassis unit.



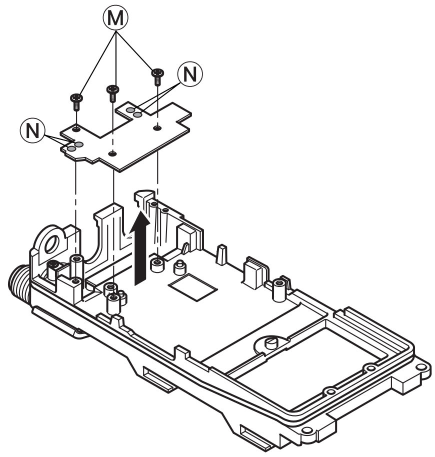
• REMOVING THE MAIN UNIT

① Unscrew 2 nuts Ⓖ, and remove the top plate Ⓗ.
② Remove the side plate Ⓘ.
③ Unscrew 6 screws Ⓙ.
④ Unsolder 8 points Ⓚ, and remove the main shield.
⑤ Unsolder 2 points Ⓛ, and take off the main unit in the direction of the arrow.



• REMOVING THE PA UNIT

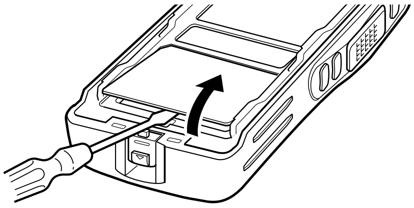
① Unscrew 3 screws Ⓜ.
② Unsolder 4 points Ⓝ, and take off the PA unit in the direction of the arrow.



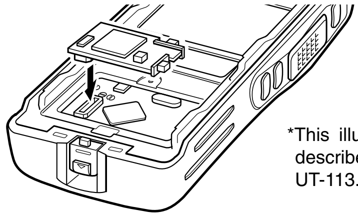
SECTION 4 OPTIONAL UNIT INSTALLATION

Install the optional unit as follows:

① Rotate **[VOL]** to turn the power OFF, and remove the battery pack.
② Remove the unit cover.
NOTE: Use a flat head screw driver or a similar flat instrument, and insert into the hollow of the chassis, then lift and take away the unit cover.
Use the supplied spare unit cover! Do not use the cover that has been removed once. Water or dust may get into the transceiver because the cover may be bent or has lost it's adhesion. This may result in the transceiver being damaged.



③ Install the unit as shown below.



*This illustration is described with the UT-113.

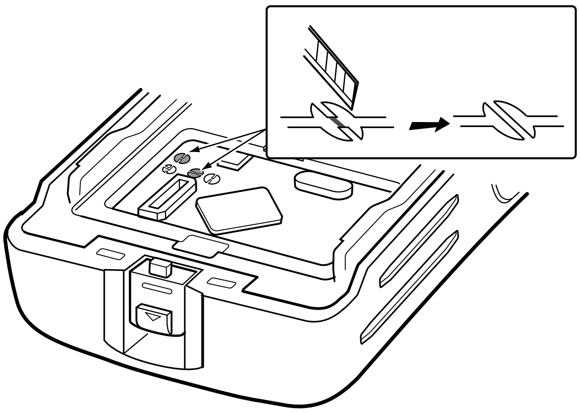
④ Replace the unit cover and the battery pack, then rotate **[VOL]** to turn the power ON.

NOTE: The optional UT-109/UT-110 SCRAMBLER UNITS, UT-105 SmarTrunk II™ LOGIC BOARD or UT-117/UT-117S SmarTrunk 3G™ LOGIC BOARD requires some PC board modifications. Please refer to the additional installation on next page.

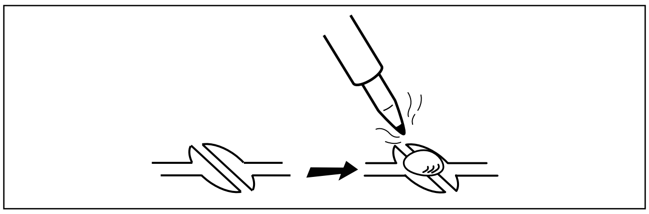
■ UT-109 and UT-110 installation

The following PC board modification is required when installing the optional UT-109 or UT-110:

① Rotate **[VOL]** to turn the power OFF, and remove the battery pack.
② Remove the unit cover as shown above.
③ Cut the pattern on the PCB at the TX mic circuit (MIC) and RX AF circuit (DISC) as shown below.
④ Install the scrambler unit as described above.
⑤ Replace the unit cover and the battery pack, then rotate **[VOL]** to turn the power ON.



NOTE: When uninstalling the scrambler unit
Be sure to re-solder the disconnected points at left, otherwise no TX modulation or AF output is available.

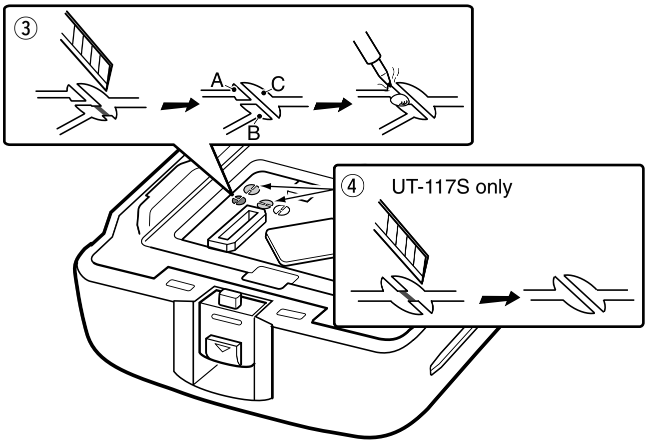


■ UT-105, UT-117 and UT-117S installation

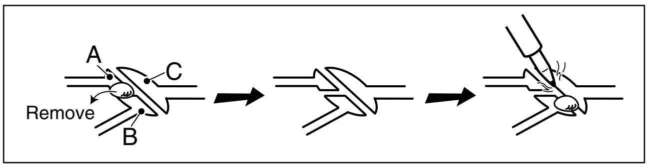
The following PC board modification is required when installing the optional UT-105, UT-117 or UT-117S:

① Rotate **[VOL]** to turn the power OFF, and remove the battery pack.
② Remove the unit cover as described above.
③ Cut and solder the pattern on the PCB at the RX AF circuit as shown at right.
The next step ④ is necessary for the UT-117S installation. Go to step ⑤ to install the UT-105 or UT-117.

④ Cut the pattern on the PCB at the TX mic circuit (MIC) and RX AF circuit (DISC) as shown at right.
⑤ Install the UT-105/UT-117/UT-117S as described above.
⑥ Replace the unit cover and the battery pack, then rotate **[VOL]** to turn the power ON.



NOTE: When uninstalling the SmarTrunk 3G™ unit
Be sure to un-solder A and B, and re-solder B and C as shown below, otherwise no AF output is available. Moreover, the UT-117S is required to re-solder the TX mic circuit (MIC) and RX AF circuit (DISC).



SECTION 5 CIRCUIT DESCRIPTION

5-1 RECEIVER CIRCUITS

RF CIRCUITS

RF circuits consist of RF filters, antenna switch, preamplifier, etc., and extracts and amplifies the signal which is desired to receive.

An antenna switch toggles RX line and TX line by PIN diodes.

While receiving, the TX line and the antenna is disconnected to prevent received signals entering. The RX line is disconnected from the GND simultaneously, and an LPF which guides received signals to the RX circuits is composed.

While transmitting, serial-connected PIN diodes are ON, thus the TX line is connected to the antenna, and the RX line is connected to the GND simultaneously to prevent transmit signal entering.

The tuned-BPF is tuned to a desired frequency to receive by variable capacitor, and extracts the signal which is desired to receive.

The signals from the antenna switching circuit pass through the two-stage tunable bandpass filters (D19, D24, L7, L8, C27, C369). The filtered signals are amplified at the RF amplifier (Q5) and then passed through the another two-stage tunable bandpass filters (D14, D15, L11, C39, C45) to suppress unwanted signals. The filtered signals are applied to the 1st mixer circuit.

Received signals enter the antenna connector (CHASSIS; J1) and pass through the low-pass filter (ANT unit; L801, L802, C803). The filtered signals are passed through the 1/4 λ type antenna switching circuit (D701, D704, D706) and then applied to the RF circuit.

D14, D15, D19 and D24 employ varactor diodes, that are controlled by the CPU via the D/A converter (IC12), to track the bandpass filter. These varactor diodes tune the center frequency of an RF passband for wide bandwidth receiving and good image response rejection.

1ST IF CIRCUITS

The 1st IF circuits consist of 1st mixer, 1st IF filter and 1st IF amplifier, and converts the received signals into the 1st IF signal, filters to remove unwanted signals and amplifies.

The RF signals from the bandpass filter are mixed with the 1st LO signals, where come from the RX VCO circuit, at the 1st mixer circuit (Q6) to produce a 46.35 MHz 1st IF signal. The 1st IF signal is passed through a monolithic filter (FI1) to suppress out-of-band signals. The filtered signal is applied to the 2nd IF circuit after being amplified at the 1st IF amplifier (Q7).

2nd IF AND FM DEMODULATOR CIRCUITS

The 2nd IF circuits consist of 2nd mixer, 2nd IF filter, 2nd IF amplifier, and converts the 1st IF signal from the 1st IF circuits into the 2nd IF signal, filters to remove unwanted signals and amplifies.

An FM IF detector IC consists of whole of the 2nd IF circuits and FM demodulator circuit.

The 1st IF signal from the IF amplifier (Q7) is applied to the 2nd mixer section of the FM IF IC (IC9, pin 16), and is mixed with the 2nd LO signal to be converted into a 450 kHz 2nd IF signal.

The FM IF IC (IC9) contains the 2nd mixer, limiter amplifier, quadrature detector, active filter and noise amplifier circuits. A 2nd LO signal (45.9 MHz) is produced at the PLL circuit by tripling it's reference frequency 15.3 MHz).

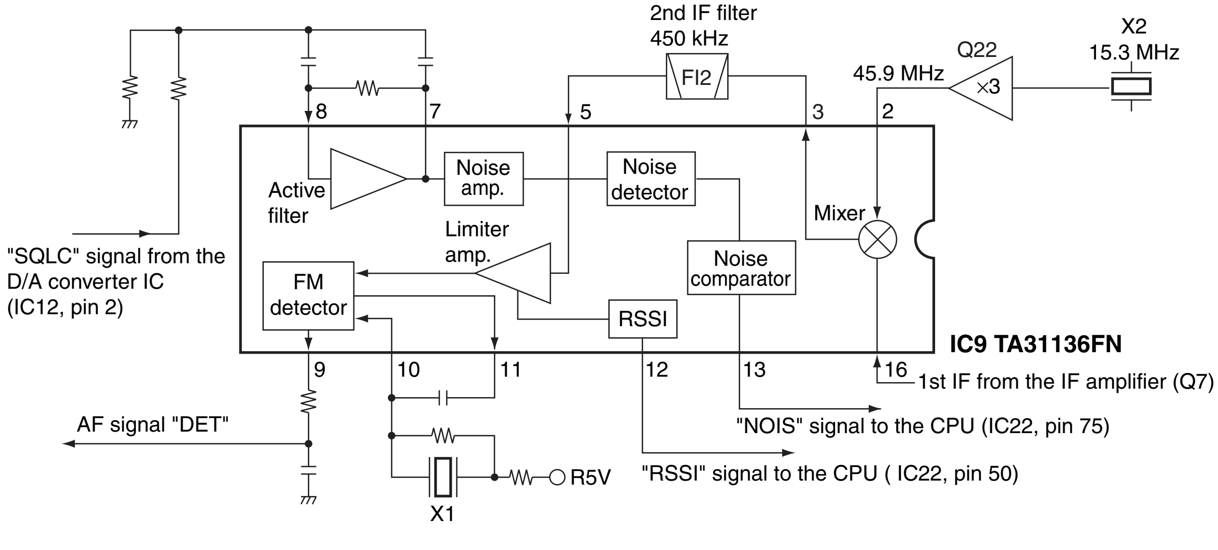
RX AF CIRCUITS

The AF circuits consist of AF filters, AF amplifier, AF power amplifier, etc., and amplify, filter the AF signals FM-demodulated by the FM IF detector IC.

The AF selector changes the destination of the AF signals.

The AF signals from the FM IF IC (IC9, pin 9) are amplified at the AF amplifier section in the base band IC (IC14, pin 23), and are then applied to the high-pass filter and low-pass filter section of it.

• 2nd IF AND FM DEMODULATOR CIRCUITS



The filtered signals pass through the high-pass filter to suppress unwanted harmonic components. The signals pass through (or bypass) scrambler and expander sections. The signals are amplified at the amplifier section in the base band IC (IC14).

The output signals from IC14 (pin 20) pass through the low-pass filter sector (IC23, pins 1, 2), and are then applied to the AF amplifier (IC15, pin 8) via the AF volume (R315).

The power amplified AF signals are output from pin 10 and applied to the internal speaker that is connected to J4 via [SP] jack (J2).

SQUELCH CIRCUITS

• NOISE SQUELCH

The noise squelch cuts off the RX AF line to mute the AF output signals when no RF signals are received. Extracting noise components (approx. 30 kHz signal) in the demodulated AF signals, the squelch circuit turns the AF power amplifier and AF switches ON and OFF.

The squelch circuits consist of the threshold level adjuster, noise filter and noise detector.

FM-demodulated AF signals from the FM IF detector IC are adjusted its level (=squelch threshold level) by DAC (D/A converter), then passed through the noise filter to extruct the noise components. The noise components are rectified by noise detector to produce DC voltage corresponding to the noise level, then applied to the CPU and compared with the reference voltage preset in the CPU to control AF power amplifier and AF switches ON and OFF.

A portion of the AF signals from the FM IF IC (IC9, pin 9) are passed through the D/A converter (IC12, pins 1, 2). The signals are applied to the active filter section in the FM IF IC (IC9, pin 8). The active filter section filters and amplifies noise components. The amplified signals are converted into the pulse-type signals at the noise detector section. The detected signals output from pin 13 (NOIS) via the noise comparator section.

The “NOIS” signal from the FM IF IC is applied to the CPU (IC22, pin 75). Then the CPU analyzes the noise condition and outputs AF mute control signal from pin 84 to control the squelch switch (Q502) as the “MUTE” signal.

• TONE SQUELCH

The tone squelch connects the RX AF line to emit the AF output signals only when receiving a signal which consists of matched tone frequency preset in the CPU.
Detecting CTCSS/DTCS signal in the demodulated AF signals, the tone squelch circuit turns the AF power amplifier and AF switches ON and OFF.

FM-demodulated AF signals from the FM IF detector IC are passed through the tone filter to remove unwanted auible siganls. then applied to the CPU and compared with the tone frequency/code preset in the CPU to control AF power amplifier and AF switches ON and OFF.

A portion of the “DET” AF signals from the FM IF IC (IC9, pin 9) pass through the low-pass filter (IC19, pin 5) to remove AF (voice) signals, and are then applied to the amplifier (IC19, pin 3). The amplified signals are applied to the CTCSS or DTCS decoder in the CPU (IC22, pin 46) via the “CDEC” line. The CPU outputs AF mute control signal from pin 84 to control the squelch switch (Q502) as the “MUTE” signal.

5-2 TRANSMITTER CIRCUITS

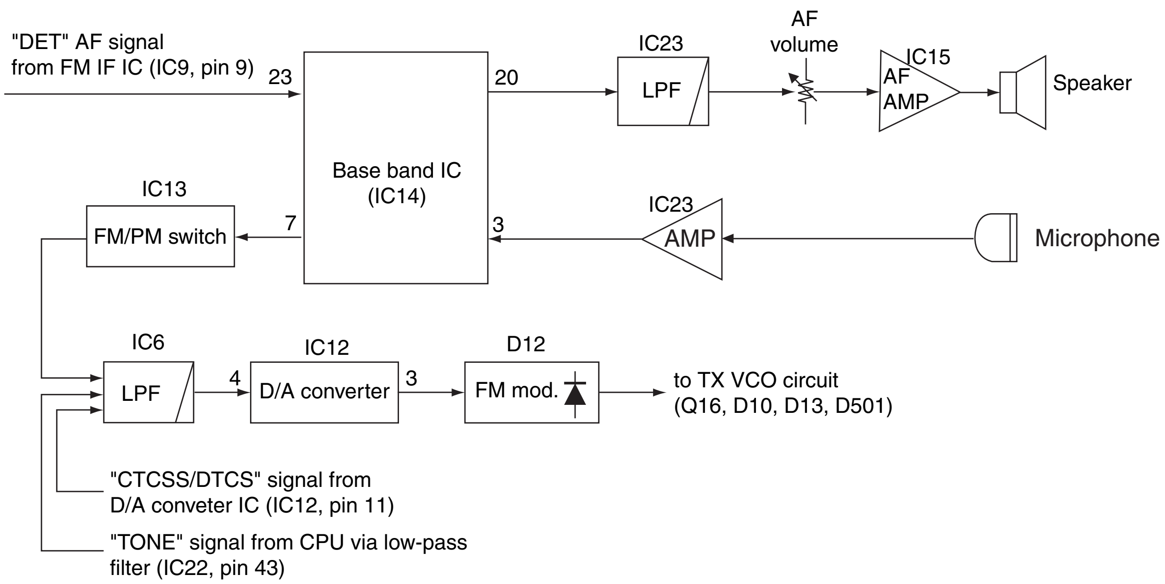
TX AF CIRCUIT

The TX AF circuit consists of microphone amplifier, ALC and AF filter. ALC (Automatic Level Controller) is an amplifier that reduces its gain automatically to prevent over deviation. The AF filter cuts off the signals except voice signals (3 kHz or higher and 300 Hz or lower).

The AF signals (MIC) from the microphone (MC1) are applied to the amplifier (IC23, pins 6, 7). The amplified signals are amplified again at the microphone amplifier section of the base band IC (IC14, pins 3). The amplified signals are passed through or bypass the compressor, scrambler sections of IC14, and are then passed through the high-pass, limiter amplifier, splatter filter sections of IC14.

The filtered AF signals from the base band IC (pin 6) are applied to the FM/PM switch (IC13, pins 6, 7), and pass through the low-pass filter (IC6, pins 1, 2). The filtered signals are applied to the D/A converter (IC12, pin 4). The output signals from the D/A converter (IC12, pin 3) are applied to the modulation circuit (D12).
AF signals range of 300 Hz to 3 kHz

• AF CIRCUIT (TX and RX)



MODULATION CIRCUIT

• VOICE SIGNAL

The modulation circuit FM-modulates the VCO oscillating signal with the AF signals from the TX AF circuit.

The AF signals from the microphone amplifier circuits are applied to the variable capacitor to change its reactance for FM modulation.

The AF signals from the D/A converter (IC12, pin 3) change the reactance of varactor diode (D12) to modulate the oscillated signal at the TX VCO circuit (Q16, D10, D13, D501). The modulated VCO signal is amplified at the buffer amplifiers (Q15, Q29) and is then applied to the drive amplifier circuit via the T/R switch (D16).

• TONE SIGNAL

Tone signals are generated in the CPU and applied to the both of the VCO and reference frequency oscillator to be modulated.

The CTCSS/DTCS signals (“CENC0,” “CENC1,” ”CENC2”) from the CPU (IC22, pins 13, 15, 16) are combined at the resistors (R222–R224) and are then pass through the low-pass filter (IC6, pins 12, 14). The filtered signals are applied to the D/A converter (IC12, pin 12) via the “TONC” line. The output signals from the D/A converter (IC12, pin 11) are mixed with the filtered Mic audio signals.
The mixed signals are passed through the D/A converter (IC12, pin 3, 4), and are then applied to the D12 in the TX VCO circuit.

TRANSMIT AMPLIFIERS

The transmit amplifers consist several RF amplifier (predriver, driver, power) and amplify the VCO output to the transmit output level.

APC CIRCUIT

The APC (Automatic Power Control) circuit stabilizes transmit output power to prevent transmit output power level change which is caused by load mismatching or heat effect, etc,. The APC circuit also selects transmit output power from high, middle and low power.

The power detector rectifies a portion of the transmit output and converts it into DC voltage which is in proportion to the transmit output power level. The detected voltage is applied to the comparator. The transmit power setting voltage is applied to another input terminal as the reference voltage.

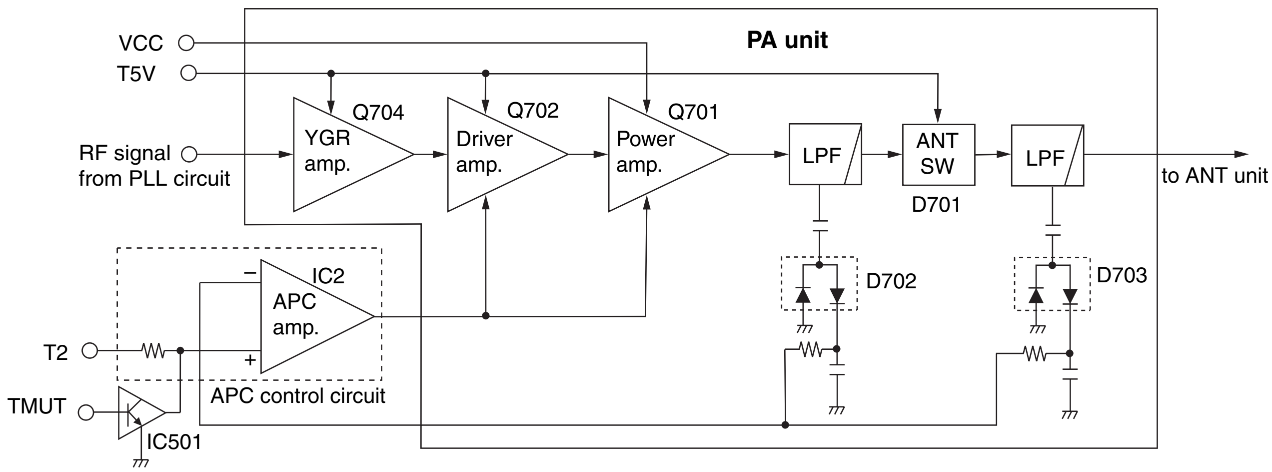
The comparator compares the detected voltage and reference voltage, and the difference of voltage is output. The output voltage controls the bias of the RF amplifiers to reduce/increase the gain of these amplifiers for stable transmit output power.

The change of transmit power is carried out by the change of reference voltage.

The power detector circuit (PA unit; D702, D703) detects the transmit power output level and converts it into DC voltage. The output voltage is at a minimum level when the antenna impedance is matched with 50 Ω and is increased when it is mismatched.

The detected voltage is applied to the differential amplifier (MAIN unit; IC2; pin 3), and the “T2” signal from the D/A converter (MAIN unit; IC12, pin 23), controlled by the CPU (MAIN unit; IC22), is applied to the other input for reference. When antenna impedance is mismatched, the detected voltage exceeds the power setting voltage. Then the output voltage of the differential amplifier (MAIN unit; IC2, pin 4) controls the input bias voltage of the drive (PA unit; Q702) and power (PA unit; Q701) amplifiers to reduce the output power.

• APC CIRCUIT



5-3 FREQUENCY SYNTHESIZER CIRCUITS

VCO

A VCO is an oscillator which its oscillation frequency is determined by the applied volatge.

Shifting the oscillation frequency range in RX/TX, the VCO generates both of the TX signal and 1st LO signals.

There are two VCOs; RX VCO and TX VCO. The RX VCO generates the 1st LO signals for the 1st IF produce, and TX VCO generates TX signal.

The VCO circuits contains a separate RX VCO (Q17, D9, D11, D500) and TX VCO (Q16, D10, D13, D501). The oscillated signal is amplified at the buffer amplifiers (Q15, Q29) and is then applied to the T/R switch (D16, D17). Then the receive 1st LO (Rx) signal is applied to the 1st mixer (Q6) and the transmit (Tx) signal to the YGR amplifier circuit (PA unit; Q704).

A portion of the signal from the buffer amplifier (Q15) is fed back to the PLL IC (IC21, pin 6) via the doubler circuit (Q14) as the comparison signal.

PLL (Phase Locked Loop) CIRCUIT

The PLL circuit provides stable oscillation for both of the transmit frequency and 1st LO frequency for receive. By comparing feedbacked VCO output and reference frequency signal and adjusting the differences.

The PLL output frequency is controlled by the serial data including divid ratio from the CPU.

A portion of VCO output is applied to the PLL IC via buffer and harmonic filter. The applied VCO output is divided according to the serial data including divid ratio from the CPU, at the prescaler and programmable divider. In the same way, the reference frequency signal from the reference frequency signal oscillator is applied to the PLL IC and divide so that these are the same frequency.

The VCO output and the reference frequency signals divide and frequency-matched are applied to the phase comparator and phase-compared. The resulted phase difference is detected as a phase-type signal, and level-adjusted at the charge pump then output. The output pulse type signal is passed through the loop filter to be converted into the DC voltage (=Lock Voltage).

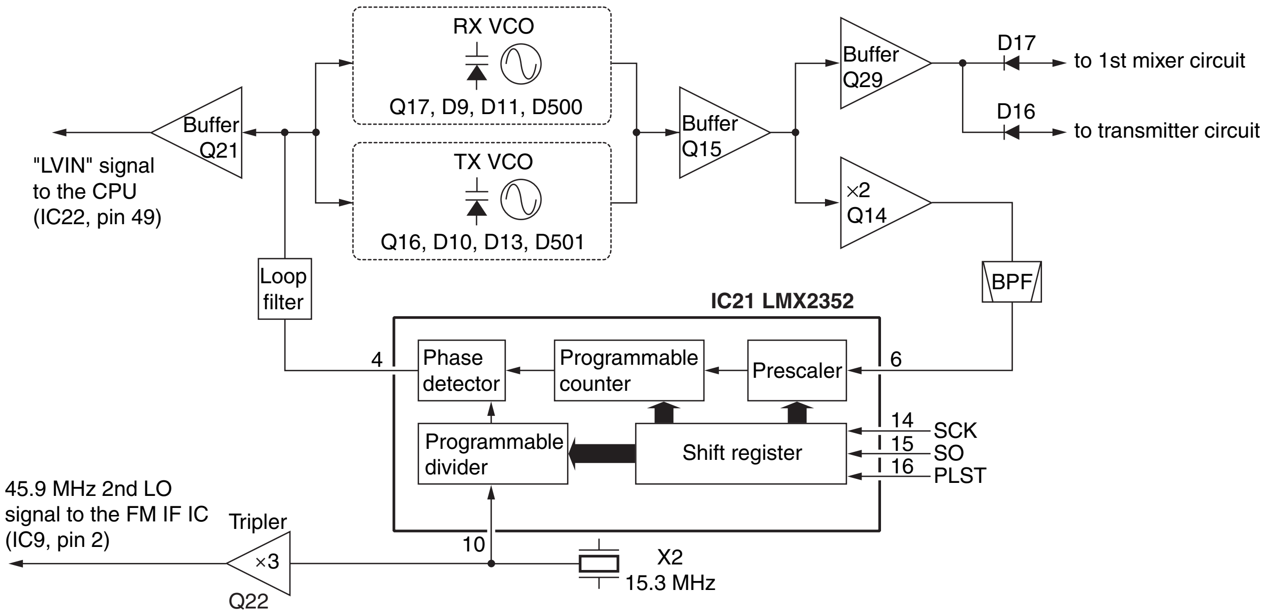
Applying the lock voltage to the variable capacitor which composes a part of the resonator of VCO, the capasitance of VD changes corresponding to the appled lock voltage. This causes the change of resonation frequency that determine the VCO oscilation frequency to keep the VCO frequency constant.

The PLL circuit contains the TX and RX VCO circuits (Q16, Q17, D9–D11, D13, D500, D501). The oscillated signal is amplified at the buffer amplifier (Q15). The output signal frequency is doubled at Q14, and is then applied to the PLL IC (IC21, pin 6) after being passed through the bandpass filter (L32, C205, C507).

Q500, D502 and D503 switch the filtering frequencies between TX and RX which is controlled by R5V.

When the oscillation frequency drifts, its phase changes from that of the reference frequency, causing a lock voltage change to compensate for the drift in the VCO oscillating frequency.

• FREQUENCY SYNTHESIZER CIRCUITS



5-4 POWER SUPPLY CIRCUIT

LINE	DESCRIPTION
VCC	The voltage from the connected battery pack.
+5V	Common 5 V converted from the VCC line at the +5 regulator circuit (IC17). The output voltage is supplied to the buffer amplifiers (Q21), PLL IC (IC21) etc.
S5V	Common 5 V converted from the VCC line at the S5 regulator circuit (Q26–Q28). The output voltage is supplied to the ripple filter (Q20), etc.
R5V	Receive 5 V converted from the S5V line at the R5 regulator circuit (Q25). The output voltage is supplied to the tripler (Q22), FM IF IC (IC9), IF amplifier (Q7), 1st mixer (Q6), RF amplifier (Q5), etc.
T5V	Transmit 5 V converted from the S5V line at the T5 regulator circuit (Q24). The output voltage is supplied to the APC amplifier (IC2), PA unit, etc.

5-6 PORT ALLOCATIONS

5-6-1 D/A CONVERTOR IC (IC12)

Pin Number	Port name	Description
10	BAL	Outputs the modulation balance level control signal. The signal is applied to the buffer amplifier (IC24, pin 1).
14	TLVA	Outputs the TX VCO lock voltage control signal.
15	RLVA	Outputs the RX VCO lock voltage control signal.
22	T1	Outputs the bandpass filter tuning control signal . The output signal is applied to the bandpass filters (D19, D240).
23	T2	• Outputs the bandpass filter tuning control signal . The output signal is applied to the bandpass filters (D14, D15). • Outputs the TX control signal . The output signal is applied to the APC amplifier (IC2, pin 1).

5-6-2 CPU (MAIN unit; IC22)

Pin number	Port name	Description
13, 15, 16	CENC0–CENC2	Output the CTCSS/DTCS signals.
29	REF	Outputs the reference oscillator correcting voltage. The voltage is applied to the buffer amplifier (IC24, pin 3)
30	PLST	Outputs strobe signals to the PLL IC (IC21, pin 16).
34	PMFM	Outputs the FM/PM modulation switching signal to the FM/PM switch (IC13, pin 5).
35	MDIO	I/O port for the serial data signals from/to the base band IC (IC14, pin 11).
36	MSCK	Outputs clock signal for the base band IC (IC14, pin 13).
37	MDIR	Outputs serial data control signal to the base band IC (IC14, pin 14).
38	MTCK	Input port for transmitting MSK clock signal from the base band IC (IC14, pin 9).
39	MTDT	Outputs MSK data for transmitting to the base band IC (IC14, pin 10).
40	MRDF	Input port for the receiving MSK detection signal from the base band IC (IC14, pin 12).
41	DAST	Outputs strobe signals to the D/A convertor (IC12, pin 6).
43	SENC	Output single tone encoder signal.
44	BEEP	Outputs beep audio signals.
45	SDEC	Input port for single tone decode signal from the base band IC (IC14, pin 21).

Pin Number	Port name	Description
46	CDEC	Input port for CTCSS/DTCS signal from the amplifier (IC19, pin 1).
48	BATV	Input port for the detect signal for connecting battery pack's voltage.
49	LVIN	Input port for the PLL lock voltage.
50	RSSI	Input port for the S-meter signal from the FM IF IC (IC9, pin 12).
51	TEMP	Input port for the transceiver's internal temperature detecting signal.
69	CSFT	Outputs shift signal for reference oscillator's frequency.
70	AFON	Outputs audio control signal. Low: While outputs audio signals from the speaker.
74	PTT	Input port for the PTT switch detection signal. Low: While the PTT switch is pushed.
75	NOIS	Input port for the noise signal from the FM IF IC (IC9, pin 13).
76	SO	Outputs serial data to the PLL IC (IC21, pin 15) and D/A convertor (IC12, pin 8).
78	SCK	Outputs serial clock signal to the PLL IC (IC21 pin 14), D/A convertor (IC12, pin 7), etc.
79	CLI	Input port for the cloning data signal.
80	CLO	Outputs the cloning data signal.
82	ESDA	I/O port for data signals from/to the EEPROM (IC10, pin 5).
84	MUTE	Outputs AF control signal . Low: While Squelch ON.
85	ESCL	Outputs clock signal to the EEPROM (IC10, pin 6).
86	S5C	Outputs the S5 regulator (Q26–Q28) control signal. Low: While the S5 regulator outputs 5 V voltage.
87	T5C	Outputs the T5 regulator (Q24) control signal. Low: While transmitting.
88	R5C	Outputs the R5 regulator (Q25) control signal. Low: While receiving.
89	TMUT	Outputs the transmitting mute switch control signal to the mute switch (Q 501). High: While muting.
90	ULCK	Input port for the PLL unlock signal. Low: The PLL circuit is unlocked.

SECTION 6 ADJUSTMENT PROCEDURE

6-1 PREPARATION

When adjusting IC-F33GT/GS/F34GT/GS, optional CS-F33G ADJ ADJUSTMENT SOFTWARE (Rev. 1.0 or later), OPC-478 CLONING CABLE (RS-232C type), OPC-478U/UC CLONING CABLE (USB type) and a JIG CABLE (see illustration at page 6-2) are required.

■ REQUIRED TEST EQUIPMENT

EQUIPMENT	GRADE AND RANGE		EQUIPMENT	GRADE AND RANGE	
DC power supply	Output voltage Current capacity	: 7.2 V DC : 5 A or more	Audio generator	Frequency range Measuring range	: 300–3000 Hz : 1–500 mV
FM deviation meter	Frequency range Measuring range	: DC–800 MHz : 0 to ±10 kHz	Attenuator	Power attenuation Capacity	: 20 or 30 dB : 10 W
Frequency counter	Frequency range Frequency accuracy Sensitivity	: 0.1–300 MHz : ±1 ppm or better : 100 mV or better	Standard signal generator (SSG)	Frequency range Output level	: 100–800 MHz : 0.1 μV to 32 mV (–127 to –17 dBm)
Digital multimeter	Input impedance	: 10 MΩ/V DC or better	AC millivoltmeter	Measuring range	: 10 mV–10 V
RF power meter	Measuring rang Frequency range Impedance SWR	: 1–10 W : 100–800 MHz : 50 Ω : Better than 1.2 : 1	Oscilloscope	Frequency rang Measuring range	: DC–20 MHz : 0.01–20 V

■ SYSTEM REQUIREMENTS

• Microsoft® Windows® 98/98SE/Me/2000
• RS-232C serial port (D-sub 9 pin)
• USB port

■ ADJUSTMENT SOFTWARE INSTALLATION

① Boot up Windows.
- Quit all applications when Windows is running.
② Insert the cloning software CD into the appropriate CD drive.
③ Select 'Run' from the [Start] menu.
④ Type the setup program name using the full path name, then push [Enter] key.
(For example; D:\Setup.exe)
⑤ Follow the prompts.
⑥ Program group 'CS-F33G ADJ' appears in the 'Programs' folder of the [Start] menu.

■ BEFORE STARTING SOFTWARE ADJUSTMENT

Program the adjustment frequencies into the transceiver using with the CS-F33G before starting the software adjustment. Otherwise, the transceiver can not start software adjustment.

CAUTION!: BACK UP the originally programmed memory data in the transceiver before programming the adjustment frequencies.
When program the adjustment frequencies into the transceiver, the transceiver's memory data will be overwritten and lose original memory data at the same time.

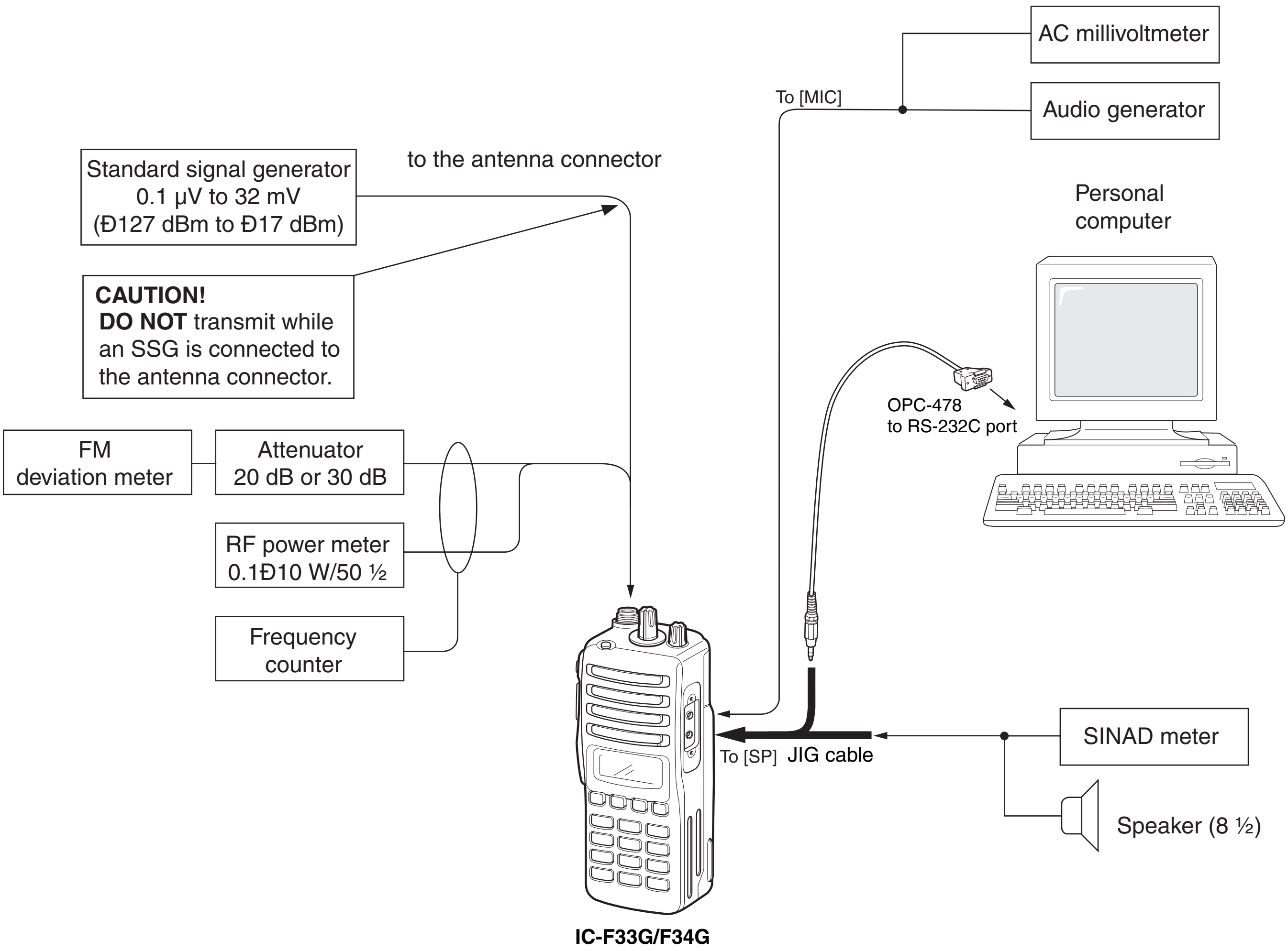
Microsoft and Windows are registered trademarks of Microsoft Corporation in the U.S.A. and other countries.

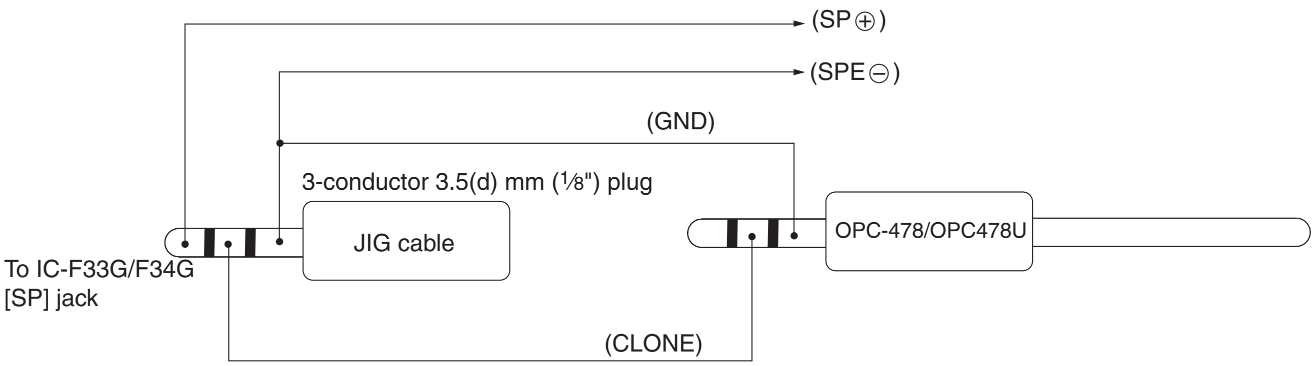
■ STARTING SOFTWARE ADJUSTMENT

① Connect the transceiver and PC with the OPC-478/U and JIG CABLE.
② Turn the transceiver power ON.
③ Boot up Windows, and click the program group 'CS-F33G ADJ' in the 'Programs' folder of the [Start] menu, then CS-F33G ADJ's window appears.
④ Click 'Connect' on the CS-F33G's window, then appears the transceiver's adjustment screen.
⑤ Set or modify adjustment data as desired.

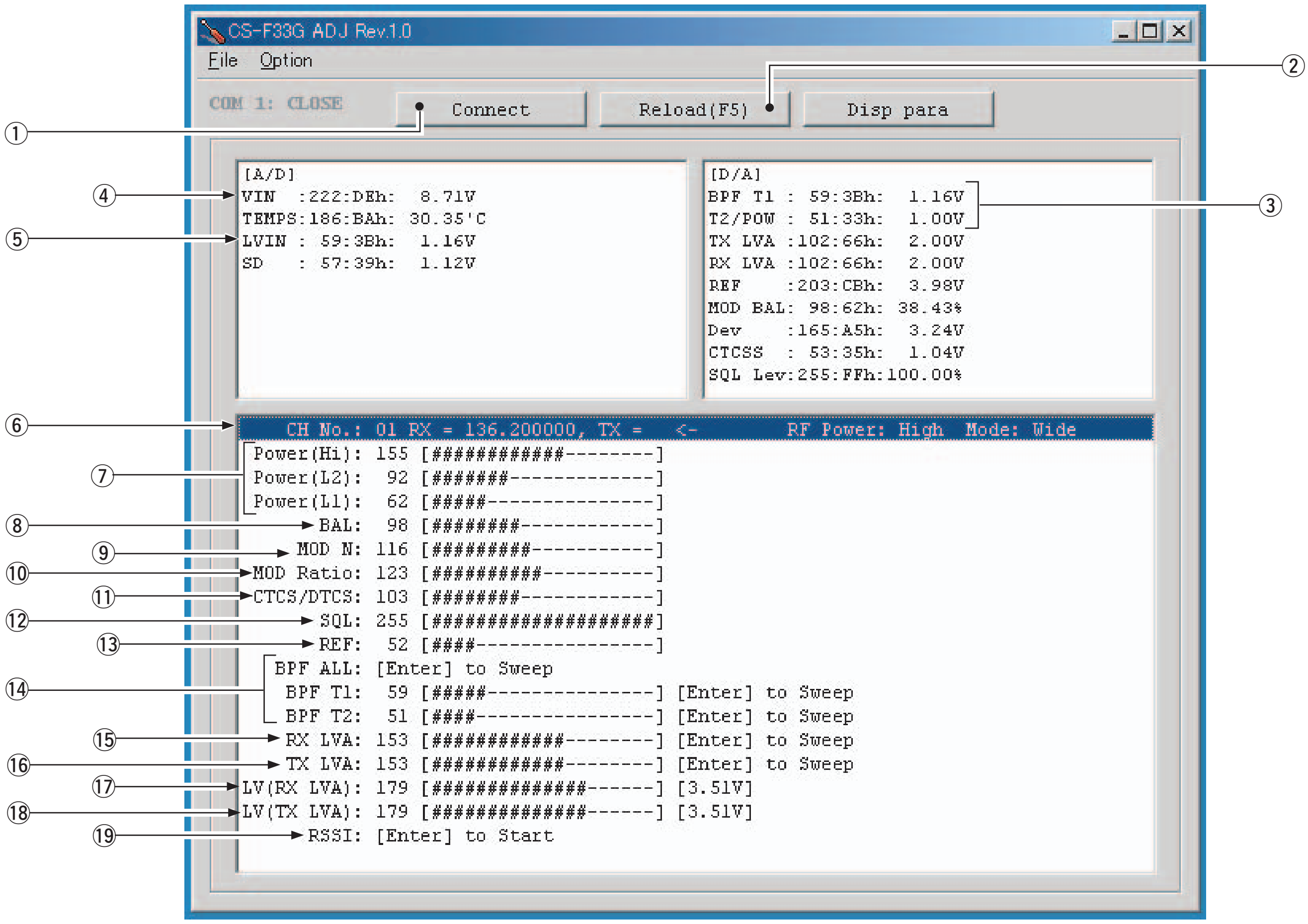
• ADJUSTMENT FREQENCY LIST

CH	FREQUENCY	ADJUSTMENT ITEM
1	155.000 MHz	TX power : High Bandwidth : Wide
2	155.000 MHz	TX power : Low 2 Bandwidth : Wide
3	155.000 MHz	TX power : Low Bandwidth : Wide
4	155.000 MHz	TX power : High Bandwidth : Narrow
5	136.000 MHZ	TX power : High Bandwidth : Wide
6	155.000 MHz	TX power : High CTCSS : 151.4 Hz DTCS : 007 Bandwidth : Wide
7	174.000 MHz	TX power : High Bandwidth : Wide
8	155.000 MHz	TX power : High Bandwidth : Middle


AC millivoltmeter
To [MIC]
Audio generator
Standard signal generator
0.1 μV to 32 mV
(Đ127 dBm to Đ17 dBm)
to the antenna connector
Personal
computer
CAUTION!
DO NOT transmit while
an SSG is connected to
the antenna connector.
OPC-478
to RS-232C port
FM
deviation meter
Attenuator
20 dB or 30 dB
RF power meter
0.1Đ10 W/50 ½
Frequency
counter
To [SP]
JIG cable
SINAD meter
Speaker (8 ½)
IC-F33G/F34G


(SP⊕)
(SPE⊖)
(GND)
3-conductor 3.5(d) mm (1⁄8") plug
JIG cable
OPC-478/OPC478U
To IC-F33G/F34G
[SP] jack
(CLONE)

• **CS-F33G ADJ'S SCREEN EXAMPLE**

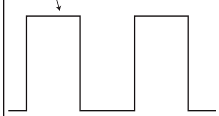


NOTE: The above values for settings are example only.
Each transceiver has its own specific values for each setting.

①: Transceiver's connection state
②: Reload adjustment data
③: Receive sensitivity measurement
④: Connected DC voltage measurement
⑤: PLL lock voltage measurement
⑥: Operating channel select
⑦: RF output power
⑧: FM modulation balance (Narrow)
⑨: FM deviation (Narrow)
⑩: FM deviation (Wide)
⑪: CTCSS/DTCS deviation
⑫: Squelch level
⑬: Reference frequency
⑭: Receive sensitivity (automatic)
⑮: PLL lock voltage for RX (automatic)
⑯: PLL lock voltage for TX (automatic)
⑰: PLL lock voltage for RX (manual)
⑱: PLL lock voltage for TX (manual)
⑲: S-meter adjustment

6-2 SOFTWARE ADJUSTMENT (TRANSMITTING)

Select an operation using [↑] / [↓]keys, then set specified value using [←] / [→] keys on the connected computer keyboard

ADJUSTMENT		ADJUSTMENT CONDITION	MEASUREMENT		VALUE
			UNIT	LOCATION	
PLL LOCK VOLTAGE [LV (RX LVA)] [LV (TX LVA)]	1	• Operating Channel : CH7 • Receiving	PC screen	Check the "LVIN" item on the CS-F33G ADJ's screen.	3.5 V
	2	• Operating Channel : CH7 • Transmitting			3.5 V
		CONVENIENT: The PLL lock voltage can be adjustment automatically. Set the cursor to "RX LVA"/"TX LVA" and then push [ENTER] key.			
	3	• Operating Channel : CH5 • Receiving	PC screen	Check the "LVIN" item on the CS-F33G ADJ's screen.	1.0–1.6 V (Verify)
	4	• Operating Channel : CH5 • Transmitting			1.0–1.6 V (Verify)
REFERENCE FREQUENCY [REF]	1	• Operating Channel : CH7 • Connect the RF power meter or 50 Ω dummy load to the antenna connector. • Transmitting	Top panel	Loosely couple the frequency counter to the antenna connector.	174.0000 MHz
OUTPUT POWER [Power (Hi)]	1	• Operating Channel : CH1 • Transmitting	Top panel	Connect the RF power meter to the antenna connector.	5.0 W
[Power (L2)]	2	• Operating Channel : CH2 • Transmitting			2.0 W
[Power (L1)]	3	• Operating Channel : CH3 • Transmitting			1.0 W
MODULATION BALANCE [BAL]	1	• Operating Channel : CH4 • No audio applied to the [MIC] connector. • Set the FM deviation meter as: HPF : OFF LPF : 20 kHz De- emphasis : OFF Detector : (P–P)/2 • Push [P0] while transmitting	Top panel	Connect the FM deviation meter with the oscilloscope to the antenna connector through the attenuator.	Set to square wave form 
FM DEVIATION [MOD N] (Narrow)	1	• Operating Channel : CH4 • Set the FM deviation meter as: HPF : OFF LPF : 20 kHz De- emphasis : OFF Detector : (P–P)/2 • Connect the audio generator to the [MIC] connector and set as : 1.0 kHz/150 mVrms • Transmitting	Top panel	Connect the FM deviation meter to the antenna connector through the attenuator.	±2.10 kHz
[MOD Ratio] (Wide)	2	• Operating Channel : CH1 • Transmitting			±4.10 kHz
[MOD Ratio] (Middle) (F34G only)	3	• Operating Channel : CH8 • Transmitting			±3.20 kHz
CTCSS/DTCS DEVIATION [CTCSS/DTCS]	1	• Operating Channel : CH6 • No audio applied to the [MIC] connector. • Transmitting	Top panel	Connect the FM deviation meter to the antenna connector through the attenuator.	±0.70 kHz
FREQUENCY DEVIATION	1	-Operating Channel : CH16 (156.800MHz) -Output power : Low -Connect an audio generator to the microphone connector and set as ; Frequency : 1kHz Level : 30mV -Set the FM deviation meter as ; HPF : OFF LPF : 20kHz De-emphasis : OFF Detector : (P-P)/2 -Transmitting	Rear Panel	Connect an FM deviation meter to the antenna connector through an attenuator.	±4.25-4.35kHz

SOFTWARE ADJUSTMENT (RECEIVING)

• Select an operation using [↑] / [↓]keys, then set specified value using [←] / [→] keys on the connected computer keyboard
• Need to adjust "S-METER ADJUSTMENT" after "RX SENSITIVITY ADJUSTMENT" is adjusted.
Otherwise , "S-METER ADJUSTMENT" will not be adjusted properly.

ADJUSTMENT		ADJUSTMENT CONDITION	MEASUREMENT		VALUE
			UNIT	LOCATION	
RX SENSITIVITY [BPF T1] [BPF T2]	1	• Operating Channel : CH5 • Connect the SSG to the antenna connector and set as: Frequency : 136.000 MHz Level : 10 μV* (–87 dBm) Modulation : 1 kHz Deviation : ±3.5 kHz • Receiving	PC screen	Connect the SINAD meter with an 8 Ω load to the [SP] jack through the JIG cable.	Minimum distortion level
		CONVENIENT: The BPF T1, BPF T2 can be adjustment automatically. ①-1: Set the cursor to "BPF ALL" and then push [ENTER] key. ①-2: The connected PC tunes BPF T1, T2 to peak levels. or ②-1: Set the cursor to one of BPF T1, T2 as desired. ②-2: Push [ENTER] key to start tuning. ②-3: Repeat ②-1 and ②-2 to perform additional BPF tuning.			
S-METER [S-METER]	1	• Operating Channel : CH5 • Connect the SSG to the antenna connector and set as: Frequency : 136.000 MHz Level : 14 μV* (–84 dBm) Modulation : 1 kHz Deviation : ±3.5 kHz • Receiving	Push the [ENTER] key on the connected computer's key-board to set "L2" level.		
	2	• Set the SSG as: Level : 0.45 μV* (–114 dBm) • Receiving	Push the [ENTER] key on the connected computer's key-board to set "L0" level.		
SQUELCH LEVEL [SQL]	1	• Operating Channel : CH1 • Connect the SSG to the antenna connector and set as: Frequency : 155.000 MHz Level : 0.2 μV* (–121 dBm) Modulation : 1 kHz Deviation : ±3.5 kHz • Receiving	Side panel	Connect speaker to the [SP] jack through the JIG cable.	Set SQL level to close squelch. Then set SQL level at the point where the audio signals just appears.

*The output level of the standard signal generator (SSG) is indicated as the SSG's open circuit.

SECTION 7 PARTS LIST

[MAIN UNIT]

REF NO.	ORDER NO.	DESCRIPTION	M.	H/V LOCATION
IC2	1110002751	S.IC TA75S01F (TE85R,F)	T	88.1/12.4
IC6	1110005340	S.IC NJM12902V-TE1	B	55.4/23.8
IC8	1110005771	S.IC S-80942CNMC-G9CT2G	B	20.8/41.5
IC9	1110003201	S.IC TA31136FNG (EL)	T	81.5/17
IC10	1130011581	S.IC 24LC64T-I/SN G	B	29.7/13.2
IC12	1190001350	S.IC M62364FP 600D	B	38.9/26.2
IC13	1130006221	S.IC TC4W53FU (TE12L,F)	B	47.1/24
IC14	1110006221	S.IC AK2346P-E2/P	B	41.5/13.2
IC15	1110001811	S.IC TA7368FG (5,ER)	T	97.3/15.4
IC17	1110005350	S.IC NJM2870F05-TE1	B	93.2/20.2
IC19	1110005330	S.IC NJM12904V-TE1- ①, ②, ③, ⑥, ⑦, ⑧	B	42.9/39.6
	1110006380	S.IC LM2904PWR ④, ⑤, ⑨, ⑩, ⑪, ⑫, ⑬	B	42.9/39.6
IC20	1130009090	S.IC LC75834W-TLM-E	T	57.3/20.3
IC21	1130010100	S.IC LMX2352TMX/NOPB	T	79.5/34.1
IC22	1140011511	S.IC HD64F2238BTF13V ④, ⑤, ⑨, ⑩, ⑬ only	B	17.4/22.4
IC23	1110005330	S.IC NJM12904V-TE1 ①, ②, ③, ⑥, ⑦, ⑧	B	36.9/39.3
	1110006380	S.IC LM2904PWR ④, ⑤, ⑨, ⑩, ⑪, ⑫, ⑬	B	36.9/39.3
IC24	1110002751	S.IC TA75S01F (TE85R,F)	B	56.2/36.9
IC25	1130007021	S.IC TC7S66FU (TE85L,F)	B	58.2/33
Q2	1590003321	S.FET TPC6103 (TE85L,F)	T	98.4/4.8
Q3	1590003290	S.TR UNR9213J-(TX)	T	93.4/5
Q4	1560000841	S.FET 2SK1829 (TE85R,F)	T	90.9/34.7
Q5	1580000731	S.FET 3SK293 (TE85L,F)	B	90.9/39
Q6	1580000760	S.FET 3SK299-T1 U73	B	86.8/29.5
Q7	1530002601	S.TR 2SC4215-O (TE85R,F)	B	89.2/19.7
Q14	1530003260	S.TR 2SC5006-T1	B	78.7/34.3
Q15	1530003260	S.TR 2SC5006-T1	B	74.9/28.1
Q16	1530003260	S.TR 2SC5006-T1	B	76.6/25.1
Q17	1530003260	S.TR 2SC5006-T1	B	76.1/33.9
Q18	1590001400	S.TR XP1214 (TX)	T	73.7/27.9
Q19	1590003290	S.TR UNR9213J-(TX)	T	73.9/25.6
Q20	1530002851	S.TR 2SC4116-BL (TE85R,F)	T	86.5/25.6
Q21	1560000541	S.FET 2SK880-Y (T5RICOM,F)	T	70.8/23.8
Q22	1530002851	S.TR 2SC4116-BL (TE85R,F)	T	81.3/24.3
Q24	1510000920	S.TR 2SA1577 T106 Q	B	63.3/14.3
Q25	1510000920	S.TR 2SA1577 T106 Q	B	64.4/10.4
Q26	1520000450	S.TR 2SB1132 T100 Q	B	56.6/11.3
Q27	1590001190	S.TR XP6501-(TX) .AB	B	57.5/7.3
Q28	1590003230	S.TR UNR9113J-(TX)	B	54.1/7.1
Q29	1530003260	S.TR 2SC5006-T1	B	78.8/23.1
Q38	1590003290	S.TR UNR9213J-(TX)	B	81.8/39.2
Q40	1590003290	S.TR UNR9213J-(TX)	B	49.5/18.4
Q41	1590001190	S.TR XP6501-(TX) .AB	T	90.8/21.3
Q42	1520000450	S.TR 2SB1132 T100 Q	T	89.3/17.2
Q43	1590003380	S.TR UNR9111J-(TX) except ①, ②, ⑥	T	77.7/4.9
	1590003400	S.TR UNR9112J ①, ②, ⑥	T	77.7/4.9
Q44	1590003270	S.TR UNR9210J-(TX)	B	29.8/5.8
Q45	1590003230	S.TR UNR9113J-(TX)	T	54.6/4.5
Q500	1590003290	S.TR UNR9213J-(TX)	T	78.6/23.7
Q501	1590003290	S.TR UNR9213J-(TX)	T	84.7/11.9
Q502	1560001360	S.FET 2SK3019 TL	B	36/11.7
Q503	1590003290	S.TR UNR9213J-(TX) ④, ⑤, ⑨, ⑩, ⑪, ⑫, ⑬ only	T	81.9/42.8
D5	1160000060	S.DIO DAN202U T106	T	93.6/7.3
D6	1790001260	S.DIO MA2S077-(TX)	B	27.6/31
D8	1790001250	S.DIO MA2S111-(TX)	T	86.7/28.6
D9	1750000771	S.VCP HVC376BTRF-E ④, ⑤, ⑨, ⑩, ⑬ only	B	69.4/30.5
D10	1750000771	S.VCP HVC376BTRF-E ④, ⑤, ⑨, ⑩, ⑬ only	B	69.1/26.5
D11	1750000721	S.VCP HVC375BTRF-E ④, ⑤, ⑨, ⑩, ⑬ only	B	73.3/33.7
D12	1720000471	S.VCP 1SV239 (TPH3,F)	B	72/28.4
D13	1750000721	S.VCP HVC375BTRF-E ④, ⑤, ⑨, ⑩, ⑬ only	B	73.5/23.1
D14	1750000711	S.VCP HVC350BTRF-E ④, ⑤, ⑨, ⑩, ⑬ only	B	86.1/35.4
D15	1750000711	S.VCP HVC350BTRF-E ④, ⑤, ⑨, ⑩, ⑬ only	B	87.4/39.5
D16	1790001260	S.DIO MA2S077-(TX)	B	84.3/18
D17	1790001260	S.DIO MA2S077-(TX)	B	83.4/22.2
D18	1790001250	S.DIO MA2S111-(TX)	T	92.9/36.6
D19	1750000721	S.VCP HVC375BTRF-E ④, ⑤, ⑨, ⑩, ⑬ only	B	94.8/39.1
D20	1790001240	S.DIO MA2S728-(TX)	B	94.9/33.4
D21	1160000060	S.DIO DAN202U T106	B	28.4/22.6
D24	1750000721	S.VCP HVC375BTRF-E ④, ⑤, ⑨, ⑩, ⑬ only	B	96.6/37.7
D25	1790001240	S.DIO MA2S728-(TX)	B	94.9/34.7
D28	1790001670	S.DIO RB706F-40T106	B	29.8/2.9
D500	1750000771	S.VCP HVC376BTRF-E ④, ⑤, ⑨, ⑩, ⑬ only	B	68.2/32.2
D501	1750000771	S.VCP HVC376BTRF-E ④, ⑤, ⑨, ⑩, ⑬ only	B	68.1/24.9
D502	1790001260	S.DIO MA2S077-(TX)	B	79.9/28.1
D503	1790001260	S.DIO MA2S077-(TX)	T	80.2/26.7
D504	1750000940	S.DIO ISS400 TE61	B	28.2/24.5
D506	1790000620	S.DIO MA77 (TX) ④, ⑤, ⑨, ⑩, ⑪, ⑫, ⑬	B	45.4/35.3

①: GT [USA-01] ②: GT [GEN-01] ③: GT [EUR-01] ④: GT [USA-02] ⑤: GT [CHN-01]
⑥: GS [USA-01] ⑦: GS [GEN-01] ⑧: GS [EUR-01] ⑨: GS [USA-02] ⑩: GS [USA-01]
⑪: GS [CHN-01] ⑫: GS [SWE-07] ⑬: GS [NOR-08] ⑭: GS [SWE-09]

[MAIN UNIT]

REF NO.	ORDER NO.	DESCRIPTION	M.	H/V LOCATION
FI1	2030000150	S.MLH FL-335 (46.350 MHz)	T	91.3/27.1
FI2	2020001530	CER CFWLB450KFFA-B0		
X1	6070000191	S.DCR CDBKB450KCAY24-R0	B	80/16.9
X2	6050011931	S.XTL CR-781A (15.3 MHz)	B	63.3/38.3
X5	6050011730	S.XTL CR-765 (3.6864 MHz)	B	38.3/4
X6	6050011830	S.XTL CR-774 (12.288 MHz)	B	30.9/31.5
L7	6200008090	S.COL LQW2BHN68NJ03L	B	99.2/38.1
L8	6200008090	S.COL LQW2BHN68NJ03L	B	93.1/40.3
L9	6200007750	S.COL LQW2BHN56NJ03L	B	88.7/36.5
L11	6200007750	S.COL LQW2BHN56NJ03L	B	85.9/33.8
L12	6200009351	S.COL ELJRE R22GFA	B	84.3/26.5
L13	6200007850	S.COL ELJNC R82K-F	B	89.4/32
L21	6200011031	S.COL ELJRF R10JFB	B	80.5/22.8
L22	6200011031	S.COL ELJRF R10JFB	B	77.2/28.5
L24	6200003640	S.COL MLF1608E 100K-T	B	70.3/26.6
L25	6200007760	S.COL LQW2BHN82NJ03L	B	71.9/23.5
L27	6200003550	S.COL MLF1608A 4R7K-T	T	68.7/26.7
L28	6200003550	S.COL MLF1608A 4R7K-T	T	68.8/30.4
L31	6200007001	S.COL ELJRE 82NGFA	B	95.3/31.3
L32	6200007911	S.COL ELJRF 18NJFB	T	77.8/27.4
L33	6200004480	S.COL MLF1608D R82K-T	T	81.4/22.4
L35	6200003540	S.COL MLF1608D R22K-T	T	84.6/25.5
L37	6200008090	S.COL LQW2BHN68NJ03L	B	71.6/33.4
L41	6200007911	S.COL ELJRF 18NJFB	B	80.2/33.5
L42	6200003550	S.COL MLF1608A 4R7K-T	T	71.2/34.2
L43	6200003550	S.COL MLF1608A 4R7K-T	T	69.4/21.9
L47	6200007720	S.COL LQW2BHN33NJ03L	B	69.1/34.3
L48	6200008090	S.COL LQW2BHN68NJ03L	B	69.3/22.7
L500	6200003640	S.COL MLF1608E 100K-T	B	70.6/30.4
L501	6200003960	S.COL MLF1608A 1R0K-T	T	74.7/31.9
L502	6200011001	S.COL ELJRF 56NJFB	B	86.3/25.4
R1	7030005530	S.RES ERJ2GEJ 100 X (10)	T	87.4/14.6
R4	7030007570	S.RES ERJ2GEJ 122 X (1.2 k)	T	86.3/9.7
R5	7030007340	S.RES ERJ2GEJ 153 X (15 k)	T	86.6/8.1
R6	7030005070	S.RES ERJ2GEJ 683 X (68 k)	T	86/15.7
R7	7030005310	S.RES ERJ2GEJ 124 X (120 k)	T	85.5/13.4
R8	7030005110	S.RES ERJ2GEJ 224 X (220 k)	T	88/10.2
R9	7030004980	S.RES ERJ2GEJ 101 X (100) ①, ②, ⑥	T	90.5/12.3
	7030004990	S.RES ERJ2GEJ 221 X (220) except ①, ②, ⑥	T	90.5/12.3
R12	7030005530	S.RES ERJ2GEJ 100 X (10)	B	90.2/36.8
R13	7030005090	S.RES ERJ2GEJ 104 X (100 k)	T	95.2/40.2
R15	7030005310	S.RES ERJ2GEJ 124 X (120 k)	T	92.2/39.3
R16	7030008280	S.RES ERJ2GEJ 271 X (270)	B	89.8/41.2
R17	7030004970	S.RES ERJ2GEJ 470 X (47)	T	88.7/36.8
R18	7030005040	S.RES ERJ2GEJ 472 X (4.7 k)	T	70.8/30.1
R19	7030005090	S.RES ERJ2GEJ 104 X (100 k)	T	91.1/37.6
R21	7030005090	S.RES ERJ2GEJ 104 X (100 k)	T	87.3/41.4
R22	7030005050	S.RES ERJ2GEJ 103 X (10 k)	T	88.5/38.9
R23	7030005090	S.RES ERJ2GEJ 104 X (100 k)	T	86.5/35.6
R24	7030005120	S.RES ERJ2GEJ 102 X (1 k)	B	86.2/22.8
R25	7030005120	S.RES ERJ2GEJ 102 X (1 k)	B	85.7/31.2
R29	7030007270	S.RES ERJ2GEJ 151 X (150)	B	89.2/27.5
R31	7030004980	S.RES ERJ2GEJ 101 X (100)	T	89.2/33.7
R32	7030010040	S.RES ERJ2GEJ-JPW	T	92.2/31.9
R33	7030007280	S.RES ERJ2GEJ 331 X (330)	B	90.2/22.9
R34	7030005090	S.RES ERJ2GEJ 104 X (100 k)	B	88.6/21.6
R35	7030004980	S.RES ERJ2GEJ 101 X (100)	B	87.2/21.2
R36	7030005030	S.RES ERJ2GEJ 152 X (1.5 k)	B	81.9/12.6
R38	7030005090	S.RES ERJ2GEJ 104 X (100 k)	T	81.8/12.2
R39	7030004970	S.RES ERJ2GEJ 470 X (47)	B	81.4/11.6
R40	7030007270	S.RES ERJ2GEJ 151 X (150)	T	81.8/21.3
R43	7030004970	S.RES ERJ2GEJ 470 X (47)	T	77.8/14.1
R44	7030005240	S.RES ERJ2GEJ 473 X (47 k)	T	77.9/21.3
R45	7030008290	S.RES ERJ2GEJ 183 X (18 k)	T	77.2/17.9
R46	7030005000	S.RES ERJ2GEJ 471 X (470)	T	76.6/20.7
R48	7030005010	S.RES ERJ2GEJ 681 X (680)	B	87.2/19.9
R50	7030005120	S.RES ERJ2GEJ 102 X (1 k)	B	84.9/22.8
R68	7030005120	S.RES ERJ2GEJ 102 X (1 k)	B	85.6/15.9
R69	7030005050	S.RES ERJ2GEJ 103 X (10 k)	B	85.6/18.2
R70	7030004980	S.RES ERJ2GEJ 101 X (100)	B	80.1/26.4
R71	7030005070	S.RES ERJ2GEJ 683 X (68 k)	B	80.1/25.5
R72	7030005090	S.RES ERJ2GEJ 104 X (100 k)	B	35.5/34.2
R73	7030008010	S.RES ERJ2GEJ 123 X (12 k)	B	39.1/19.5
R74	7030006610	S.RES ERJ2GEJ 394 X (390 k)	B	40.1/19.5
R75	7030005240	S.RES ERJ2GEJ 473 X (47 k)	B	78.5/31
R76	7030004980	S.RES ERJ2GEJ 101 X (100)	B	78.7/32
R77	7030004980	S.RES ERJ2GEJ 101 X (100)	B	77.2/30.9
R78	7030005090	S.RES ERJ2GEJ 104 X (100 k)	B	75.9/29.7
R79	7030008340	S.RES RR0510P-182-D (1.8 k)	B	76.1/32.4
R80	7030005050	S.RES ERJ2GEJ 103 X (10 k)	T	75.1/23.9
R81	7030005090	S.RES ERJ2GEJ 104 X (100 k)	B	47.9/20.8
R82	7030009320	S.RES ERJ2GEJ 4R7 X (4.7)	B	74.8/25.7
R83	7030008340	S.RES RR0510P-182-D (1.8 k)	B	75.3/23.9
R84	7030011000	S.RES RR0510P-392-D (3.9 k)	B	74.6/22.7
R85	7030011000	S.RES RR0510P-392-D (3.9 k)	B	73.5/29.7
R86	7030005090	S.RES ERJ2GEJ 104 X (100 k)	T	71.5/25.8
R87	7030005000	S.RES ERJ2GEJ 471 X (470)	B	75.4/31.2
R88	7030008370	S.RES ERJ2GEJ 561 X (560)	B	75.1/26.6
R89	7030005050	S.RES ERJ2GEJ 103 X (10 k)	T	70.2/25.6
R90	7030005110	S.RES ERJ2GEJ 224 X (220 k)	T	71.3/21
R91	7030005060	S.RES ERJ2GEJ 333 X (33 k)	T	70.7/19.7

M.=Mounted side (T: Mounted on the Top side, B: Mounted on the Bottom side)
S.=Surface mount

[MAIN UNIT]

REF NO.	ORDER NO.	DESCRIPTION	M.	H/V LOCATION
R92	7030005090	S.RES ERJ2GEJ 104 X (100 k)	T	72.5/21.8
R93	7030005060	S.RES ERJ2GEJ 333 X (33 k)	B	46.2/20.4
R94	7030010040	S.RES ERJ2GEJ-JPW	T	72.3/29.6
R95	7030005030	S.RES ERJ2GEJ 152 X (1.5 k)	T	69.9/30.1
R96	7030005120	S.RES ERJ2GEJ 102 X (1 k)	B	87.2/37.4
R97	7030005120	S.RES ERJ2GEJ 102 X (1 k)	B	11.6/29.9
R98	7030007290	S.RES ERJ2GEJ 222 X (2.2 k)	T	86.4/27.5
R100	7030005050	S.RES ERJ2GEJ 103 X (10 k)	T	72.9/20.5
R101	7030005120	S.RES ERJ2GEJ 102 X (1 k)	T	73.9/23.9
R103	7030007060	S.RES ERJ2GEJ 684X (680 k)	B	56.6/40.1
R104	7030005240	S.RES ERJ2GEJ 473 X (47 k)	B	55/39.1
R106	7030005160	S.RES ERJ2GEJ 105 X (1 M)	B	43.5/7.9
R107	7030005060	S.RES ERJ2GEJ 333 X (33 k)	B	37.5/7.7
R108	7030005000	S.RES ERJ2GEJ 471 X (470)	B	64/35.4
R110	7030008300	S.RES ERJ2GEJ 184 X (180 k)	T	70.8/17.9
R111	7030005090	S.RES ERJ2GEJ 104 X (100 k)	T	66.1/32.4
R114	7030005080	S.RES ERJ2GEJ 823 X (82 k)	B	38.9/7.3
R115	7030007570	S.RES ERJ2GEJ 122 X (1.2 k)	T	85.8/23.4
R116	7030007060	S.RES ERJ2GEJ 684X (680 k)	T	83.2/26.3
R117	7030005160	S.RES ERJ2GEJ 105 X (1 M)	B	40.6/7.2
R118	7030005110	S.RES ERJ2GEJ 224 X (220 k)	B	26.9/6.3
R119	7030005240	S.RES ERJ2GEJ 473 X (47 k)	B	36.5/7.7
R120	7030005240	S.RES ERJ2GEJ 473 X (47 k)	B	41.6/19.9
R121	7030005110	S.RES ERJ2GEJ 224 X (220 k)	B	36.4/44.6
R122	7030005100	S.RES ERJ2GEJ 154 X (150 k)	B	35/43.1
R123	7030005060	S.RES ERJ2GEJ 333 X (33 k)	B	70.3/41.9
R124	7030005090	S.RES ERJ2GEJ 104 X (100 k)	T	67.3/20.9
R130	7030007300	S.RES ERJ2GEJ 332 X (3.3 k)	T	99.4/35.2
R131	7030005050	S.RES ERJ2GEJ 103 X (10 k)	B	101.3/41.5
R147	7030005090	S.RES ERJ2GEJ 104 X (100 k)	B	55.2/29.8
R148	7030005070	S.RES ERJ2GEJ 683 X (68 k)	B	55.2/30.8
R151	7030005240	S.RES ERJ2GEJ 473 X (47 k)	B	49.8/25.5
R152	7030005700	S.RES ERJ2GEJ 274 X (270 k)	B	52.1/24.4
R154	7030005310	S.RES ERJ2GEJ 124 X (120 k)	B	53.5/28
R156	7030010040	S.RES ERJ2GEJ-JPW	B	54.7/28.5
R157	7030005050	S.RES ERJ2GEJ 103 X (10 k)	B	53.5/29
R161	7030005050	S.RES ERJ2GEJ 103 X (10 k)	B	61.4/14.4
R162	7030005040	S.RES ERJ2GEJ 472 X (4.7 k)	B	60.1/12.9
R163	7030005050	S.RES ERJ2GEJ 103 X (10 k)	B	62.5/11.4
R164	7030005040	S.RES ERJ2GEJ 472 X (4.7 k)	B	62.1/10.1
R165	7030005050	S.RES ERJ2GEJ 103 X (10 k)	B	55.5/8.2
R166	7030007290	S.RES ERJ2GEJ 222 X (2.2 k)	B	58/5.3
R172	7030005220	S.RES ERJ2GEJ 223 X (22 k)	T	88.7/34.9
R173	7030008400	S.RES ERJ2GEJ 182 X (1.8 k)	T	91.1/36.6
R174	7030005170	S.RES ERJ2GEJ 474 X (470 k)	T	92.9/34.4
R175	7030005110	S.RES ERJ2GEJ 224 X (220 k)	T	92.2/32.9
R181	7030005220	S.RES ERJ2GEJ 223 X (22 k)	B	40/34.9
R182	7030005220	S.RES ERJ2GEJ 223 X (22 k)	B	39.4/41.3
R183	7030005220	S.RES ERJ2GEJ 223 X (22 k)	B	40.4/41.3
R184	7030005090	S.RES ERJ2GEJ 104 X (100 k) ①, ②, ③, ⑥, ⑦, ⑧	B	43.8/33.3
	7030007300	S.RES ERJ2GEJ 332 X (3.3 k) ④, ⑤, ⑨, ⑩, ⑪, ⑫, ⑬	B	43.8/33.3
R185	7030005170	S.RES ERJ2GEJ 474 X (470 k) ①, ②, ③, ⑥, ⑦, ⑧	B	43.8/35.3
	7030005290	S.RES ERJ2GEJ 682 X (6.8 k) ④, ⑤, ⑨, ⑩, ⑪, ⑫, ⑬	B	43.8/35.3
R186	7030005000	S.RES ERJ2GEJ 471 X (470)	B	45.5/39.7
R203	7030005110	S.RES ERJ2GEJ 224 X (220 k)	B	12.2/5.5
R204	7030005090	S.RES ERJ2GEJ 104 X (100 k)	B	12.3/3.6
R205	7030005090	S.RES ERJ2GEJ 104 X (100 k)	B	28/19.3
R209	7030005240	S.RES ERJ2GEJ 473 X (47 k)	B	51.2/17.8
R210	7030005240	S.RES ERJ2GEJ 473 X (47 k)	B	51.2/19.5
R211	7030005240	S.RES ERJ2GEJ 473 X (47 k)	B	53.6/18.7
R213	7030005040	S.RES ERJ2GEJ 472 X (4.7 k)	B	51.8/20.8
R214	7030005240	S.RES ERJ2GEJ 473 X (47 k)	B	50.2/20.6
R215	7030005070	S.RES ERJ2GEJ 683 X (68 k)	B	59/20.7
R216	7030005070	S.RES ERJ2GEJ 683 X (68 k)	B	59/22.8
R217	7030005070	S.RES ERJ2GEJ 683 X (68 k)	B	58.9/24.8
R218	7030005070	S.RES ERJ2GEJ 683 X (68 k)	B	59/25.9
R219	7030008010	S.RES ERJ2GEJ 123 X (12 k)	B	59/27.8
R220	7030005220	S.RES ERJ2GEJ 223 X (22 k)	B	58.7/29.6
R221	7030005220	S.RES ERJ2GEJ 223 X (22 k)	B	5.7/13.8
R222	7030008300	S.RES ERJ2GEJ 184 X (180 k)	B	7.8/15.6
R223	7030005720	S.RES ERJ2GEJ 563 X (56 k)	B	6.8/15.4
R224	7030005220	S.RES ERJ2GEJ 223 X (22 k)	B	5.8/15.4
R225	7030007260	S.RES ERJ2GEJ 330 X (33)	T	101.4/18.8
R226	7030005530	S.RES ERJ2GEJ 100 X (10)	T	94.5/18.8
R227	7030009140	S.RES ERJ2GEJ 272 X (2.7 k)	T	89/20.8
R228	7030007300	S.RES ERJ2GEJ 332 X (3.3 k)	T	88.6/22.3
R229	7030005120	S.RES ERJ2GEJ 102 X (1 k)	T	92.9/22.1
R230	7030007350	S.RES ERJ2GEJ 393 X (39 k)	B	59/26.9
R231	7030005100	S.RES ERJ2GEJ 154 X (150 k) ④, ⑤, ⑨, ⑩, ⑬	B	30.4/22.6
	7030007340	S.RES ERJ2GEJ 153 X (15 k) except ④, ⑤, ⑨, ⑩, ⑬	B	30.4/22.6
R232	7030005090	S.RES ERJ2GEJ 104 X (100 k)	B	58.7/28.7
R233	7030004980	S.RES ERJ2GEJ 101 X (100)	T	98.4/10.3
R234	7030005530	S.RES ERJ2GEJ 100 X (10)	T	100.7/12.4
R235	7030005000	S.RES ERJ2GEJ 471 X (470)	T	83.5/5
R236	7030005060	S.RES ERJ2GEJ 333 X (33 k)	T	75.7/4.3
R237	7030005530	S.RES ERJ2GEJ 100 X (10)	B	23.6/14
R238	7030005000	S.RES ERJ2GEJ 471 X (470)	B	83/8.4
R239	7030007340	S.RES ERJ2GEJ 153 X (15 k)	B	27.9/6.4
R240	7030005210	S.RES ERJ2GEJ 822 X (8.2 k)	B	35.2/32.9
R241	7030005110	S.RES ERJ2GEJ 224 X (220 k)	B	40/31.9
R242	7030005230	S.RES ERJ2GEJ 334 X (330 k)	B	35.2/31.9
R243	7030005040	S.RES ERJ2GEJ 472 X (4.7 k)	B	38.6/32.4
R244	7030005210	S.RES ERJ2GEJ 822 X (8.2 k)	B	40/33.9
R245	7030005070	S.RES ERJ2GEJ 683 X (68 k)	B	40/35.9
R246	7030008290	S.RES ERJ2GEJ 183 X (18 k)	T	98.5/8.1
R247	7030005000	S.RES ERJ2GEJ 471 X (470)	B	36.6/20.7
R256	7510001730	S.TMR ERTJOEP 473J	B	20/32.9
R257	7030005090	S.RES ERJ2GEJ 104 X (100 k)	B	19/33.9

①: GT [USA-01] ②: GT [GEN-01] ③: GT [EUR-01] ④: GT [USA-02] ⑤: GT [CHN-01]
⑥: GS [USA-01] ⑦: GS [GEN-01] ⑧: GS [EUR-01] ⑨: GS [USA-02] ⑩: GS [USA-01]
⑪: GS [CHN-01] ⑫: GS [SWE-07] ⑬: GS [NOR-08] ⑭: GS [SWE-09]

[MAIN UNIT]

REF NO.	ORDER NO.	DESCRIPTION	M.	H/V LOCATION
R258	7030005530	S.RES ERJ2GEJ 100 X (10)	B	24.9/28
R259	7030005160	S.RES ERJ2GEJ 105 X (1 M)	B	27.7/27.8
R260	7030008010	S.RES ERJ2GEJ 123 X (12 k)	B	27.3/29.3
R261	7030008010	S.RES ERJ2GEJ 123 X (12 k)	B	26/30.5
R262	7030008010	S.RES ERJ2GEJ 123 X (12 k)	B	27.3/34
R263	7030005090	S.RES ERJ2GEJ 104 X (100 k)	B	22.9/32.9
R264	7030006010	S.RES RR0510P-472-D (4.7 k)	B	15.3/33.7
R265	7030006010	S.RES RR0510P-472-D (4.7 k)	B	14.8/32.7
R266	7030005090	S.RES ERJ2GEJ 104 X (100 k)	B	45/18.5
R267	7030005090	S.RES ERJ2GEJ 104 X (100 k)	B	44/18.5
R269	7030005090	S.RES ERJ2GEJ 104 X (100 k)	B	46/18.5
R270	7030007290	S.RES ERJ2GEJ 222 X (2.2 k)	B	19.9/31.9
R272	7030004980	S.RES ERJ2GEJ 101 X (100)	T	56.3/4.4
R273	7030010040	S.RES ERJ2GEJ-JPW	B	15.6/5.3
R275	7030005110	S.RES ERJ2GEJ 224 X (220 k)	B	14.4/5
R282	7030005090	S.RES ERJ2GEJ 104 X (100 k)	B	34.4/39.5
R283	7030005090	S.RES ERJ2GEJ 104 X (100 k)	B	34.4/37.9
R288	7030005040	S.RES ERJ2GEJ 472 X (4.7 k)	B	13.5/5
R289	7030005090	S.RES ERJ2GEJ 104 X (100 k)	B	38.4/33.6
R291	7030005120	S.RES ERJ2GEJ 102 X (1 k)	B	9.5/14.7
R292	7030005090	S.RES ERJ2GEJ 104 X (100 k)	B	29.8/18
R293	7030005050	S.RES ERJ2GEJ 103 X (10 k)	B	28.3/18
R295	7030005240	S.RES ERJ2GEJ 473 X (47 k)	T	62.1/14.1
R300	7030005090	S.RES ERJ2GEJ 104 X (100 k)	T	61.7/16.4
R301	7030005070	S.RES ERJ2GEJ 683 X (68 k)	B	47.9/27.4
R302	7030005090	S.RES ERJ2GEJ 104 X (100 k)	T	95.2/39.2
R303	7030005050	S.RES ERJ2GEJ 103 X (10 k)	T	95.1/41.2
R307	7030005580	S.RES ERJ2GEJ 560 X (56)	T	76.1/28.8
R308	7030005100	S.RES ERJ2GEJ 154 X (150 k) ①, ②, ③, ⑥, ⑦, ⑧	T	71.8/17.9
	7030006610	S.RES ERJ2GEJ 394 X (390 k) ④, ⑤, ⑨, ⑩, ⑪, ⑫, ⑬	T	71.8/17.9
R309	7030005050	S.RES ERJ2GEJ 103 X (10 k)	B	7/14.1
R315	7210003061	VAR TP76N00N-15F-A103-2251A		
R318	7030005700	S.RES ERJ2GEJ 274 X (270 k)	T	95.9/3.9
R319	7030005090	S.RES ERJ2GEJ 104 X (100 k)	T	94.3/3.4
R320	7030005090	S.RES ERJ2GEJ 104 X (100 k)	B	93.7/9
R321	7030005090	S.RES ERJ2GEJ 104 X (100 k)	B	14.6/41.6
R323	7030005110	S.RES ERJ2GEJ 224 X (220 k)	B	5.3/26.6
R325	7030005110	S.RES ERJ2GEJ 224 X (220 k)	B	5.3/25.6
R327	7030005110	S.RES ERJ2GEJ 224 X (220 k)	B	5.3/24.6
R329	7030005110	S.RES ERJ2GEJ 224 X (220 k)	B	5.3/23.6
R331	7030005110	S.RES ERJ2GEJ 224 X (220 k)	B	5.3/22.6
R333	7030005110	S.RES ERJ2GEJ 224 X (220 k)	B	5.3/21.6
R335	7030005110	S.RES ERJ2GEJ 224 X (220 k)	B	5.3/20.6
R336	7030005170	S.RES ERJ2GEJ 474 X (470 k)	B	7/26.6
R337	7030005170	S.RES ERJ2GEJ 474 X (470 k)	B	7/25.6
R338	7030005170	S.RES ERJ2GEJ 474 X (470 k)	B	7/24.6
R339	7030005170	S.RES ERJ2GEJ 474 X (470 k)	B	7/23.6
R340	7030005170	S.RES ERJ2GEJ 474 X (470 k)	B	7/22.6
R341	7030005170	S.RES ERJ2GEJ 474 X (470 k)	B	7/21.6
R342	7030005170	S.RES ERJ2GEJ 474 X (470 k)	B	7/20.6
R343	7030005170	S.RES ERJ2GEJ 474 X (470 k)	B	7/19.6
R344	7030005170	S.RES ERJ2GEJ 474 X (470 k)	B	5.3/19.6
R345	7030005120	S.RES ERJ2GEJ 102 X (1 k)	T	81/38.7
R346	7030005120	S.RES ERJ2GEJ 102 X (1 k)	T	82/38.7
R347	7030005120	S.RES ERJ2GEJ 102 X (1 k)	T	83/38.7
R348	7030005120	S.RES ERJ2GEJ 102 X (1 k)	T	84.1/33.2
R349	7030005120	S.RES ERJ2GEJ 102 X (1 k)	B	28/20.4
R350	7030005120	S.RES ERJ2GEJ 102 X (1 k)	B	22.7/15.1
R351	7030005120	S.RES ERJ2GEJ 102 X (1 k)	B	31.4/20.8
R352	7030005120	S.RES ERJ2GEJ 102 X (1 k)	B	8.5/26.9
R353	7030005120	S.RES ERJ2GEJ 102 X (1 k)	B	13.9/13.6
R354	7030005120	S.RES ERJ2GEJ 102 X (1 k)	B	12.7/14
R355	7030005120	S.RES ERJ2GEJ 102 X (1 k)	B	11.4/14.3
R356	7030005120	S.RES ERJ2GEJ 102 X (1 k)	B	11.5/15.4
R357	7030006610	S.RES ERJ2GEJ 394 X (390 k)	B	34.4/41.1
R358	7030006610	S.RES ERJ2GEJ 394 X (390 k)	B	34.4/36.3
R359	7030010040	S.RES ERJ2GEJ-JPW	T	84/30.6
R362	7030005090	S.RES ERJ2GEJ 104 X (100 k)	B	55.5/33.1
R500	7030005040	S.RES ERJ2GEJ 472 X (4.7 k)	B	78.6/27.3
R501	7030005040	S.RES ERJ2GEJ 472 X (4.7 k)	T	79.1/27
R502	7030005040	S.RES ERJ2GEJ 472 X (4.7 k)	T	76.5/24.4
R506	7030005110	S.RES ERJ2GEJ 224 X (220 k)	B	89/34
R507	7030005120	S.RES ERJ2GEJ 102 X (1 k)	T	76.2/17.9
R508	7030005040	S.RES ERJ2GEJ 472 X (4.7 k)	B	49.3/28.2
R509	7030005040	S.RES ERJ2GEJ 472 X (4.7 k)	B	50.9/28.2
R510	7030005240	S.RES ERJ2GEJ 473 X (47 k)	B	37.8/19.9
R511	7030005210	S.RES ERJ2GEJ 822 X (8.2 k)	B	36.5/17.8
R512	7030005210	S.RES ERJ2GEJ 822 X (8.2 k)	B	35.2/17.7
R513	7030005240	S.RES ERJ2GEJ 473 X (47 k)	B	34.6/16.5
R514	7030005090	S.RES ERJ2GEJ 104 X (100 k)	B	33.4/38.6
R515	7030005120	S.RES ERJ2GEJ 102 X (1 k)	T	75.7/7
R516	7030005090	S.RES ERJ2GEJ 104 X (100 k)	B	53.6/32.1
R517	7030005230	S.RES ERJ2GEJ 334 X (330 k)	B	31.3/22.6
R518	7030009270	S.RES ERJ2GEJ 821 X (820)	B	88/41.5
R519	7030005090	S.RES ERJ2GEJ 104 X (100 k)	B	45.2/21.6
R520	7030007350	S.RES ERJ2GEJ 393 X (39 k)	B	5.3/28.6
R521	7030005600	S.RES ERJ2GEJ 273 X (27 k)	B	6.2/27.5
R522	7030005120	S.RES ERJ2GEJ 102 X (1 k)	T	95.5/30.3
R523	7030005120	S.RES ERJ2GEJ 102 X (1 k)	B	36.6/13.6
R524	7030005090	S.RES ERJ2GEJ 104 X (100 k)	B	31.4/7.3
R525	7030005120	S.RES ERJ2GEJ 102 X (1 k)	T	75.4/38.3
R526	7030010040	S.RES ERJ2GEJ-JPW	T	79.1/29.8
R527	7030005310	S.RES ERJ2GEJ 124 X (120 k)	B	34.1/43.1
C17	4550007120	S.TAN F92 1D 224MPA	T	70.2/27.7
C18	4030017380	S.CER ECJ0EC1H050B ①, ②, ⑥	B	95.4/32.4
	4030017580	S.CER ECJ0EC1H060C except ①, ②, ⑥	B	95.4/32.4
C19	4030017360	S.CER ECJ0EC1H030B	B	88.9/41.2
C22	4030017550	S.CER ECJ0EC1H1R5B	B	95.3/37.2
C24	4030018860	S.CER ECJ0EB0J105K	T	94.6/42.6

M.=Mounted side (T: Mounted on the Top side, B: Mounted on the Bottom side)
S.=Surface mount

[MAIN UNIT]

REF NO.	ORDER NO.	DESCRIPTION	M.	H/V LOCATION
C25	4030017580	S.CER ECJ0EC1H060C	B	96.6/34.6
C26	4030017460	S.CER ECJ0EB1E102K	B	37.6/34.6
C27	4030017430	S.CER ECJ0EC1H101J	B	96.7/39.8
C28	4030017370	S.CER ECJ0EC1H3R5B	B	95.8/39.8
C29	4030017580	S.CER ECJ0EC1H060C	B	93.4/38.2
C30	4030016930	S.CER ECJ0EB1A104K	B	90/34.2
C31	4030017910	S.CER ECJ0EB1H152K	B	41.6/18.7
C32	4030017460	S.CER ECJ0EB1E102K	B	91.6/41.2
C33	4030017420	S.CER ECJ0EC1H470J	B	90.7/41.2
C34	4030017460	S.CER ECJ0EB1E102K	B	47.9/19.8
C35	4030017760	S.CER ECJ0EB1H222K	B	44.3/20.9
C36	4030017460	S.CER ECJ0EB1E102K	T	88.7/37.7
C37	4030017420	S.CER ECJ0EC1H470J	T	88.2/41.4
C39	4030017460	S.CER ECJ0EB1E102K	B	87.1/41.5
C40	4030017550	S.CER ECJ0EC1H1R5B	B	86.3/36.7
C41	4030017640	S.CER ECJ0EC1H150J	B	86.9/31.9
C42	4030017460	S.CER ECJ0EB1E102K	T	89.4/40.2
C43	4030017460	S.CER ECJ0EB1E102K	T	87.3/38.6
C44	4030017570	S.CER ECJ0EC1H040B	B	85.7/32.2
C45	4030017460	S.CER ECJ0EB1E102K	B	84/35.5
C46	4030017420	S.CER ECJ0EC1H470J	B	39.5/18
C47	4030016970	S.CER ECJ0EB1C223K	B	12.4/30.6
C48	4030016790	S.CER ECJ0EB1C103K	B	87.2/27.5
C49	4030017350	S.CER ECJ0EC1H020B	B	86.3/27.4
C50	4030017460	S.CER ECJ0EB1E102K	B	88.2/27.5
C51	4030017460	S.CER ECJ0EB1E102K	T	90.5/31.9
C52	4030017630	S.CER ECJ0EC1H120J	B	89/29.1
C53	4030016790	S.CER ECJ0EB1C103K	B	90.7/29.1
C54	4030017460	S.CER ECJ0EB1E102K	B	90.7/30.1
C55	4030017570	S.CER ECJ0EC1H040B	T	94.6/30.3
C56	4030017390	S.CER ECJ0EC1H180J	T	94.6/25.6
C57	4030017460	S.CER ECJ0EB1E102K	T	88/32.1
C58	4030017460	S.CER ECJ0EB1E102K	B	89.2/22.9
C59	4030017460	S.CER ECJ0EB1E102K	B	86.2/21.2
C60	4030017460	S.CER ECJ0EB1E102K	B	88.2/22.9
C61	4030017430	S.CER ECJ0EC1H101J	B	87.2/18.9
C62	4030017680	S.CER ECJ0EC1H820J	T	80/12.7
C63	4030017420	S.CER ECJ0EC1H470J ⑤, ⑩	B	33.1/20.7
	4030017460	S.CER ECJ0EB1E102K except ⑤, ⑩	B	33.1/20.7
C64	4030017460	S.CER ECJ0EB1E102K	B	34.3/14
C65	4030016930	S.CER ECJ0EB1A104K	B	17.6/32.9
C66	4030017460	S.CER ECJ0EB1E102K	T	77.8/15.1
C67	4030017460	S.CER ECJ0EB1E102K	B	78.1/12.6
C69	4030017750	S.CER ECJ0EB1E122K	T	77.9/19.2
C70	4030017750	S.CER ECJ0EB1E122K	T	77.9/20.2
C71	4030017330	S.CER ECJ0EF1C104Z	T	80/21.2
C73	4030017460	S.CER ECJ0EB1E102K	T	92/13
C74	4030017460	S.CER ECJ0EB1E102K	B	86.6/6
C75	4550007040	S.TAN ECST0JZ106R except ④, ⑤, ⑨, ⑩, ⑬	B	75.6/12.2
	4550007600	S.TAN F920J106MPABMA ④, ⑤, ⑨, ⑩, ⑬	B	75.6/12.2
C76	4030016930	S.CER ECJ0EB1A104K	T	90.3/13.7
C77	4030017460	S.CER ECJ0EB1E102K	B	89/16.4
C78	4030017460	S.CER ECJ0EB1E102K	T	85.2/7.4
C79	4030016950	S.CER ECJ0EB1A473K ①, ②, ⑥	T	87.9/9
	4030017420	S.CER ECJ0EC1H470J except ①, ②, ⑥	T	87.9/9
C80	4030016790	S.CER ECJ0EB1C103K except ①, ②, ⑥	T	85.5/14.4
	4030016930	S.CER ECJ0EB1A104K ①, ②, ⑥	T	85.5/14.4
C90	4030017400	S.CER ECJ0EC1H220J	B	44.7/6.3
C95	4030017710	S.CER ECJ0EC1H181J	B	38.9/8.3
C98	4030017400	S.CER ECJ0EC1H220J	B	32/5.5
C100	4030017620	S.CER ECJ0EC1H100C	B	84.6/20.9
C102	4030017590	S.CER ECJ0EC1H070C	B	78.2/25.1
C103	4030018120	S.CER ECJ0EC1H110J	B	78.1/29.8
C104	4030017460	S.CER ECJ0EB1E102K	B	76.3/28.5
C105	4030017460	S.CER ECJ0EB1E102K	B	78.7/32.9
C107	4030017460	S.CER ECJ0EB1E102K	B	80.1/24.6
C108	4030016790	S.CER ECJ0EB1C103K	B	88/16.4
C109	4030017460	S.CER ECJ0EB1E102K	T	77.3/25.3
C110	4030017730	S.CER ECJ0EB1E471K	T	84.6/27.6
C111	4030017460	S.CER ECJ0EB1E102K	T	75.5/25.6
C112	4030017750	S.CER ECJ0EB1E122K	B	35.5/7.7
C113	4030017540	S.CER ECJ0EC1HR75B	B	76.3/31.2
C114	4030017660	S.CER ECJ0EC1H330J	B	74.6/32.6
C115	4030017660	S.CER ECJ0EC1H330J	B	74.5/34.2
C116	4030017460	S.CER ECJ0EB1E102K	B	77.5/32.5
C118	4030017530	S.CER ECJ0EC1H0R5B	B	73.4/28
C119	4030017460	S.CER ECJ0EB1E102K	T	76.2/23
C120	4030017730	S.CER ECJ0EB1E471K	B	76.4/22.7
C121	4030017390	S.CER ECJ0EC1H180J	B	74.6/24.8
C122	4030017660	S.CER ECJ0EC1H330J	B	75.5/22.7
C123	4030017510	S.CER ECJ0EC1H680J	B	73.5/26.4
C124	4030017340	S.CER ECJ0EC1H010B	B	71.4/26
C125	4030018110	S.CER ECJ0EB1H272K	B	40.6/8.3
C126	4030017660	S.CER ECJ0EC1H330J	B	73.8/30.9
C128	4030016930	S.CER ECJ0EB1A104K	B	34.2/7.2
C129	4030017340	S.CER ECJ0EC1H010B	B	72.3/26
C130	4030017330	S.CER ECJ0EF1C104Z	B	36.1/9.4
C131	4030017330	S.CER ECJ0EF1C104Z	B	43/19.4
C132	4030016930	S.CER ECJ0EB1A104K	T	71.7/19.7
C133	4030017400	S.CER ECJ0EC1H220J	B	73.4/25.2
C134	4030017390	S.CER ECJ0EC1H180J	B	72.5/30.9
C135	4030017460	S.CER ECJ0EB1E102K	T	73.7/22.4
C136	4030017430	S.CER ECJ0EC1H101J	B	36.4/43.6
C137	4030016790	S.CER ECJ0EB1C103K	T	87/23.2
C139	4030016930	S.CER ECJ0EB1A104K	T	77.3/26.2
C141	4030017460	S.CER ECJ0EB1E102K	T	73.7/21.5
C142	4030016790	S.CER ECJ0EB1C103K	B	68.7/41.9
C143	4030017460	S.CER ECJ0EB1E102K	T	72.4/25.8
C145	4030017730	S.CER ECJ0EB1E471K	T	69.8/20.3
C146	4340000281	S.MLR ECPU1E473KB5	T	70.3/32.3
C147	4030017420	S.CER ECJ0EC1H470J	B	68.7/40.9
C148	4550006250	S.TAN TEESVA 1A 106M8R	T	86.5/32.6

①: GT [USA-01] ②: GT [GEN-01] ③: GT [EUR-01] ④: GT [USA-02] ⑤: GT [CHN-01]
⑥: GS [USA-01] ⑦: GS [GEN-01] ⑧: GS [EUR-01] ⑨: GS [USA-02] ⑩: GS [USA-01]
⑪: GS [CHN-01] ⑫: GS [SWE-07] ⑬: GS [NOR-08] ⑭: GS [SWE-09]

[MAIN UNIT]

REF NO.	ORDER NO.	DESCRIPTION	M.	H/V LOCATION
C149	4030017460	S.CER ECJ0EB1E102K	T	67.2/7.6
C150	4030018860	S.CER ECJ0EB0J105K	T	69.9/18.2
C151	4030017460	S.CER ECJ0EB1E102K	B	24.4/15.1
C152	4030017420	S.CER ECJ0EC1H470J	T	83.1/40.3
C153	4030017420	S.CER ECJ0EC1H470J	T	82.2/40.3
C154	4030017420	S.CER ECJ0EC1H470J	T	81.2/40.3
C155	4030017460	S.CER ECJ0EB1E102K	T	77.5/29.8
C156	4030017430	S.CER ECJ0EC1H101J	B	64.9/35.4
C157	4030017620	S.CER ECJ0EC1H100C	B	63.1/35.4
C158	4030017330	S.CER ECJ0EF1C104Z	B	61.7/35.3
C159	4030017460	S.CER ECJ0EB1E102K	B	59.4/38
C160	4030017460	S.CER ECJ0EB1E102K	T	69.1/12.4
C161	4030017620	S.CER ECJ0EC1H100C	T	83.3/27.6
C162	4030017500	S.CER ECJ0EC1H560J	T	84/23.3
C163	4030017570	S.CER ECJ0EC1H040B	T	84.9/23.3
C164	4030017590	S.CER ECJ0EC1H070C	T	83.1/23.3
C165	4030016790	S.CER ECJ0EB1C103K	T	83.1/25
C166	4030017360	S.CER ECJ0EC1H030B	T	83.1/21.7
C167	4030017330	S.CER ECJ0EF1C104Z	B	83.1/11.6
C168	4030017460	S.CER ECJ0EB1E102K	T	75/8.5
C169	4030017420	S.CER ECJ0EC1H470J	T	68.8/7
C170	4030017330	S.CER ECJ0EF1C104Z	B	51.1/26
C171	4030017460	S.CER ECJ0EB1E102K	B	70.3/40.9
C172	4030016950	S.CER ECJ0EB1A473K	B	52.1/26
C174	4030017710	S.CER ECJ0EC1H181J	B	52.2/27.8
C175	4030017420	S.CER ECJ0EC1H470J	B	71.8/41.4
C176	4030016930	S.CER ECJ0EB1A104K	T	99.4/36.2
C177	4030016930	S.CER ECJ0EB1A104K	B	100.3/41.5
C180	4030017330	S.CER ECJ0EF1C104Z	B	55.2/31.9
C182	4030017460	S.CER ECJ0EB1E102K	B	87.2/22.9
C183	4030017620	S.CER ECJ0EC1H100C	B	84.9/23.8
C184	4030017460	S.CER ECJ0EB1E102K	T	91.3/38.9
C185	4030017420	S.CER ECJ0EC1H470J	T	90.4/38.9
C186	4030016930	S.CER ECJ0EB1A104K	T	88.7/35.8
C188	4030017460	S.CER ECJ0EB1E102K	T	82.7/12.2
C191	4030017420	S.CER ECJ0EC1H470J	B	70.1/32.5
C192	4030017440	S.CER ECJ0EC1H221J	B	70.1/24.5
C205	4030017350	S.CER ECJ0EC1H020B	B	80.2/30.6
C206	4030017580	S.CER ECJ0EC1H060C except ⑤, ⑩	B	80.2/29.7
	4030017600	S.CER ECJ0EC1H080C ⑤, ⑩	B	80.2/29.7
C207	4030017460	S.CER ECJ0EB1E102K	B	80/32.2
C208	4030017380	S.CER ECJ0EC1H050B	B	79/29.8
C209	4030017460	S.CER ECJ0EB1E102K	T	75.7/27.6
C211	4030017260	S.CER C2012 JB 0J 475KT	B	46/29.9
C221	4030016940	S.CER ECJ0EB1A393K	B	39.4/39.7
C222	4030016790	S.CER ECJ0EB1C103K	B	40.4/42.9
C223	4030017330	S.CER ECJ0EF1C104Z	B	40.4/39.7
C224	4550005980	S.TAN TEESVA 1A 475M8R ①, ②, ③, ⑥, ⑦, ⑧ only		
C225	4030017730	S.CER ECJ0EB1E471K	B	43.8/34.3
C226	4030017460	S.CER ECJ0EB1E102K	B	46.5/39.7
C231	4030016790	S.CER ECJ0EB1C103K	B	60.1/13.9
C232	4030016790	S.CER ECJ0EB1C103K	B	62.1/9.1
C233	4550007090	S.TAN TEESVA 1A 226M8R	B	60/8.1
C234	4030017730	S.CER ECJ0EB1E471K ④, ⑤, ⑨, ⑩, ⑪, ⑫, ⑬	B	55.7/5.2
	4030018860	S.CER ECJ0EB0J105K ①, ②, ③, ⑥, ⑦, ⑧	B	55.7/5.2
C235	4030016790	S.CER ECJ0EB1C103K	B	54.7/5.2
C236	4030018560	S.CER C2012 JB 1A 475K-T	B	94/23.8
C237	4030016790	S.CER ECJ0EB1C103K	B	92.9/17.9
C238	4550007070	S.TAN TEESVP 1A 475M8R	B	92/24.6
C239	4030017330	S.CER ECJ0EF1C104Z	B	92.9/16.9
C240	4030017460	S.CER ECJ0EB1E102K	B	56.8/29.8
C241	4030017460	S.CER ECJ0EB1E102K	B	60.1/14.9
C242	4030017460	S.CER ECJ0EB1E102K	B	64.8/8.4
C302	4030016790	S.CER ECJ0EB1C103K	T	71.7/31
C303	4030017460	S.CER ECJ0EB1E102K	T	74.8/34
C308	4550007090	S.TAN TEESVA 1A 226M8R	B	33.8/10.5
C309	4030017490	S.CER C1608 JB 1A 105K-T	B	35.8/15.4
C310	4030017490	S.CER C1608 JB 1A 105K-T	B	33.3/15.1
C312	4030016780	S.CER ECJ0EB1C153K	B	52.3/17.8
C314	4030017740	S.CER ECJ0EB1E821K	B	55.2/18.7
C315	4030017330	S.CER ECJ0EF1C104Z	B	49.2/20.6
C316	4030017420	S.CER ECJ0EC1H470J	B	57.4/19.1
C317	4030017770	S.CER ECJ0EB1E332K	B	59/21.7
C318	4030017690	S.CER ECJ0EC1H121J	B	57.3/28.5
C319	4030017760	S.CER ECJ0EB1H222K	B	58.9/23.8
C320	4030017460	S.CER ECJ0EB1E102K	B	60.6/26.9
C321	4030017460	S.CER ECJ0EB1E102K	T	91.1/3.1
C322	4030017420	S.CER ECJ0EC1H470J	T	100.1/18.6
C323	4030016950	S.CER ECJ0EB1A473K	T	94.5/20.4
C324	4550007110	S.TAN SY6-1A107M-RC	B	99.4/16.5
C325	4550006250	S.TAN TEESVA 1A 106M8R	T	101.4/15.8
C326	4550007080	S.TAN TEESVA 1C 106M8R	T	92.9/16.9
C327	4030017330	S.CER ECJ0EF1C104Z	T	93.8/13.6
C328	4030017460	S.CER ECJ0EB1E102K	T	87.7/20.3
C329	4030017460	S.CER ECJ0EB1E102K	T	87.7/21.3
C330	4030017330	S.CER ECJ0EF1C104Z	T	92.9/21.1
C331	4030017460	S.CER ECJ0EB1E102K	T	101.7/12.4
C332	4030017460	S.CER ECJ0EB1E102K	T	82.9/3.7
C333	4550007040	S.TAN ECST0JZ106R except ④, ⑤, ⑨, ⑩, ⑬	T	81.5/4
	4550007600	S.TAN F920J106MPABMA ④, ⑤, ⑨, ⑩, ⑬	T	81.5/4
C334	4030017330	S.CER ECJ0EF1C104Z	T	75.7/5.4
C335	4030018870	S.CER ECJ0EF0J105Z	B	40/32.9
C336	4030017730	S.CER ECJ0EB1E471K	B	40/36.9
C337	4030017490	S.CER C1608 JB 1A 105K-T	T	96.4/7.9
C338	4030017330	S.CER ECJ0EF1C104Z	B	34.5/20.7
C339	4030016790	S.CER ECJ0EB1C103K	B	32.6/18
C340	4030017330	S.CER ECJ0EF1C104Z	B	9.6/16.5
C345	4030017330	S.CER ECJ0EF1C104Z	B	19/34.9
C346	4030017600	S.CER ECJ0EC1H080C	B	27.5/26.4

M.=Mounted side (T: Mounted on the Top side, B: Mounted on the Bottom side)
S.=Surface mount

[MAIN UNIT]

REF NO.	ORDER NO.	DESCRIPTION	M.	H/V LOCATION
C347	4030017640	S.CER ECJ0EC1H150J	B	27.4/36
C348	4030017400	S.CER ECJ0EC1H220J	B	26.6/28
C349	4030017330	S.CER ECJ0EF1C104Z	B	26/31.5
C350	4030017330	S.CER ECJ0EF1C104Z	B	27.3/33
C351	4030017330	S.CER ECJ0EF1C104Z	B	27.4/35
C352	4030017030	S.CER ECJ0EB1A273K	B	23/41.1
C353	4030016930	S.CER ECJ0EB1A104K	B	14/32
C354	4030016790	S.CER ECJ0EB1C103K	B	30.8/18
C355	4030017460	S.CER ECJ0EB1E102K	B	51.5/7.6
C356	4030017330	S.CER ECJ0EF1C104Z	B	15.4/4
C357	4030018560	S.CER C2012 JB 1A 475K-T	B	25.3/40.9
C359	4030017330	S.CER ECJ0EF1C104Z	B	21.6/38.3
C360	4030017330	S.CER ECJ0EF1C104Z	B	49.8/26.5
C368	4030017460	S.CER ECJ0EB1E102K	T	94.8/38
C369	4030017430	S.CER ECJ0EC1H101J	B	94.6/41.3
C371	4030017330	S.CER ECJ0EF1C104Z	B	45.9/32.5
C375	4030017460	S.CER ECJ0EB1E102K	T	86/18
C376	4030017460	S.CER ECJ0EB1E102K	T	86/17
C377	4030017460	S.CER ECJ0EB1E102K	B	30.4/8.7
C378	4030017460	S.CER ECJ0EB1E102K	B	37.9/44.2
C379	4030017460	S.CER ECJ0EB1E102K	T	84.1/3.7
C380	4030017330	S.CER ECJ0EF1C104Z	B	36.8/33.6
C384	4030018100	S.CER ECJ0EB1H681K	T	61.7/15.4
C386	4030017330	S.CER ECJ0EF1C104Z	T	58.6/13.3
C387	4030017330	S.CER ECJ0EF1C104Z	T	59.8/13.3
C388	4030017330	S.CER ECJ0EF1C104Z	T	60.9/14.1
C390	4030017420	S.CER ECJ0EC1H470J	T	80.7/29.8
C393	4030017330	S.CER ECJ0EF1C104Z	T	77.8/16.1
C394	4030017330	S.CER ECJ0EF1C104Z	T	78.2/17.4
C398	4030016930	S.CER ECJ0EB1A104K	T	67/32.4
C399	4550007120	S.TAN F92 1D 224MPA	T	67.4/34.1
C400	4030016930	S.CER ECJ0EB1A104K	T	67.3/22.7
C401	4030018860	S.CER ECJ0EB0J105K	T	67.3/23.6
C402	4030017460	S.CER ECJ0EB1E102K	T	92.9/19.9
C403	4030017460	S.CER ECJ0EB1E102K		
		①, ②, ③, ⑥, ⑦, ⑧ only		
C404	4030016790	S.CER ECJ0EB1C103K	B	59.1/35.3
C405	4030017460	S.CER ECJ0EB1E102K	B	39.4/42.9
C406	4030016930	S.CER ECJ0EB1A104K	B	52.3/19.5
C407	4030017460	S.CER ECJ0EB1E102K	T	95.9/2.9
C408	4030017460	S.CER ECJ0EB1E102K	T	100.9/4.2
C409	4030017460	S.CER ECJ0EB1E102K	B	16.6/32.9
C411	4030016930	S.CER ECJ0EB1A104K	B	18.6/32.4
C412	4030017420	S.CER ECJ0EC1H470J	T	78.4/3.1
C413	4030018110	S.CER ECJ0EB1H272K	T	74.8/17.1
C414	4030018870	S.CER ECJ0EF0J105Z	B	34.5/34.2
C500	4030017610	S.CER ECJ0EC1H090C	B	68.3/30.1
C503	4030017610	S.CER ECJ0EC1H090C	B	68.8/28.2
C504	4030017360	S.CER ECJ0EC1H030B	B	68/27
C505	4030017360	S.CER ECJ0EC1H030B	B	69.2/24.5
C506	4030017580	S.CER ECJ0EC1H060C except ⑤, ⑩	T	79.9/28.3
	4030017600	S.CER ECJ0EC1H080C ⑤, ⑩	T	79.9/28.3
C507	4030017350	S.CER ECJ0EC1H020B	T	76.9/27.4
C508	4030017380	S.CER ECJ0EC1H050B	T	77.7/28.6
C509	4030016930	S.CER ECJ0EB1A104K	B	92/33.2
C510	4550007040	S.TAN ECST0JZ106R ③, ⑦, ⑧, ⑪, ⑫	T	89.1/7.6
	4550007070	S.TAN TEESVP 1A 475M8R ①, ②, ⑥	T	89.1/7.6
	4550007600	S.TAN F920J106MPABMA		
		④, ⑤, ⑨, ⑩, ⑬	T	89.1/7.6
C511	4030016790	S.CER ECJ0EB1C103K	B	88.8/38.8
C512	4030016930	S.CER ECJ0EB1A104K	T	73.9/34
C513	4030017460	S.CER ECJ0EB1E102K		
		①, ②, ③, ⑥, ⑦, ⑧ only		
C514	4030017460	S.CER ECJ0EB1E102K		
		①, ②, ③, ⑥, ⑦, ⑧ only		
C515	4030017660	S.CER ECJ0EC1H330J	B	56.6/41
C516	4550006780	S.TAN TEESVB2 0J 476M8R		
		④, ⑤, ⑨, ⑩, ⑪, ⑫, ⑬ only	B	30.4/41.2
C517	4550006780	S.TAN TEESVB2 0J 476M8R		
		④, ⑤, ⑨, ⑩, ⑪, ⑫, ⑬ only	B	55.6/15.5
J2	6450002250	CNR HSJ1456-010320		
J3	6450001680	CNR HSJ1122-010010		
J4	6510021901	S.CNR BM02B-ASRS-TF (LF) (SN)	T	88.1/4.5
J5	6510018430	S.CNR AXN330C038P	B	15.2/9.8
J6	6510024390	S.CNR IMSA-6176S-03Y900	B	88.2/8.8
	6510024391	S.CNR IMSA-6176S-03Y902	B	88.2/8.8
DS1	5010000160	S.LED LNJ310M6URA	T	57.3/6
DS2	5010000160	S.LED LNJ310M6URA	T	57.3/39.4
DS3	5030003050	LCD S11188 <SUC>		
MC1	7700002760	MIC EM6027P-46C33-G-01		
S1	2230001060	S.SW EVQ-PUL 02K	T	102.2/38.1
S2	2260002840	SW SKHLLFA010		
S3	2260002800	S.SW SW-167 (SKQTLAE010)	B	61.1/44.2
S4	2260002800	S.SW SW-167 (SKQTLAE010)	B	51.6/44.2
S5	2260002800	S.SW SW-167 (SKQTLAE010)	B	99.6/44.2
S27	2250000180	ECR EC10SP16-47		
EP3	6910015370	S.BEA ACZ1005Y-102-T	B	59.4/36.9
EP4	6910015370	S.BEA ACZ1005Y-102-T	B	37.4/19
EP5	6910015370	S.BEA ACZ1005Y-102-T	B	31.9/8.5
EP7	8930063020	LCT SRCN-2721-SP-N-W		
EP11	6910015370	S.BEA ACZ1005Y-102-T	T	78/11.7
EP12	0800008400	ADP IC20-DES-V TRANSCRYPT		

①: GT [USA-01] ②: GT [GEN-01] ③: GT [EUR-01] ④: GT [USA-02] ⑤: GT [CHN-01]
⑥: GS [USA-01] ⑦: GS [GEN-01] ⑧: GS [EUR-01] ⑨: GS [USA-02] ⑩: GS [USA-01]
⑪: GS [CHN-01] ⑫: GS [SWE-07] ⑬: GS [NOR-08] ⑭: GS [SWE-09]

[PA UNIT]

REF NO.	ORDER NO.	DESCRIPTION	M.	H/V LOCATION
Q701	1560001232	S.FET RD07MVS2-T112	B	22.6/8.3
Q702	1560001241	S.FET RD01MUS1-T113	B	16/8.3
Q704	1530003260	S.TR 2SC5006-T1	T	3.8/10.3
D701	1750000581	S.DIO 1SV307 (TPH3,F)	T	33.9/12.8
D702	1790001670	S.DIO RB706F-40T106	T	28.8/17.8
D703	1790001670	S.DIO RB706F-40T106	B	31.7/13.5
D704	1750000581	S.DIO 1SV307 (TPH3,F)	B	28.4/16.6
D705	1790001240	S.DIO MA2S728-(TX)	T	25.9/18.1
D706	1750000581	S.DIO 1SV307 (TPH3,F)	B	30.1/16.6
L701	6200002861	S.COL NLV25T-4R7J	B	34.4/12.4
L702	6200007911	S.COL ELJRF 18NJFB	B	18/12.6
L703	6200012390	S.COL 0.30-0.92-3TR 5.8N	T	28/13.7
L704	6200012970	S.COL 0.30-0.91-4TR 8.6N	T	24.2/14
L705	6200012720	S.COL 0.30-0.9-9TR 22.3N		
			T	19.2/13.7
L706	6200003590	S.COL EXCCL3225U1	B	10.7/15.9
L707	6200010991	S.COL ELJRF 47NJFB	T	2.3/11.7
L708	6200008280	S.COL 0.30-1.7-7TL 50N except ⑤, ⑩	T	32.8/10.5
L708	6200012470	S.COL 0.30-1.7-7TL 45.3N ⑤, ⑩	T	32.8/10.5
L709	6200008170	S.COL 0.35-1.6-8TL 54N except ⑤, ⑩	T	33.5/16.8
L709	6200012910	S.COL 0.35-1.6-8TL 45.5N ⑤, ⑩	T	33.5/16.8
L712	6200009290	S.COL LQW18AN47NG00D	B	33.2/16.3
R701	7030007270	S.RES ERJ2GEJ 151 X (150)	B	29.7/10.4
R703	7030005040	S.RES ERJ2GEJ 472 X (4.7 k)	T	25.4/16.7
R704	7030007250	S.RES ERJ2GEJ 220 X (22)	B	19.3/5.2
R705	7030005090	S.RES ERJ2GEJ 104 X (100 k)	T	19.1/2.3
R706	7030005040	S.RES ERJ2GEJ 472 X (4.7 k)	T	18.1/2.3
R708	7030005590	S.RES ERJ2GEJ 680 X (68)	B	12.2/11
R709	7030005220	S.RES ERJ2GEJ 223 X (22 k)	B	9.9/11.5
R710	7030005040	S.RES ERJ2GEJ 472 X (4.7 k)	B	9.9/9.9
R715	7030005000	S.RES ERJ2GEJ 471 X (470)	T	4.9/7.7
R726	7030005040	S.RES ERJ2GEJ 472 X (4.7 k)	B	28.9/14.2
R730	7030007290	S.RES ERJ2GEJ 222 X (2.2 k)	T	3.3/8.7
R732	7030004980	S.RES ERJ2GEJ 101 X (100)	T	5.8/10.7
R733	7030010040	S.RES ERJ2GEJ-JPW	T	3.2/5.7
R734	7030010040	S.RES ERJ2GEJ-JPW	T	4.2/14.2
R735	7030010040	S.RES ERJ2GEJ-JPW	T	6.4/14.6
R736	7030010040	S.RES ERJ2GEJ-JPW	B	14.2/13.5
R737	7030004990	S.RES ERJ2GEJ 221 X (220)	T	3.2/6.7
R738	7030004980	S.RES ERJ2GEJ 101 X (100)	B	18/11.6
C701	4030017460	S.CER ECJ0EB1E102K	T	35/11
C702	4030017430	S.CER ECJ0EC1H101J	B	31.3/10.5
C703	4030017420	S.CER ECJ0EC1H470J	B	32.3/10.5
C704	4030017390	S.CER ECJ0EC1H180J	B	31.8/9.2
C705	4030007040	S.CER C1608 CH 1H 180J-T	T	31.3/14.5
C706	4030007050	S.CER C1608 CH 1H 220J-T	T	29.7/14
C707	4030017460	S.CER ECJ0EB1E102K	T	26.9/16.6
C708	4030017510	S.CER ECJ0EC1H680J	T	27.9/15.2
C711	4030007100	S.CER C1608 CH 1H 560J-T	T	26.2/14
C715	4030017420	S.CER ECJ0EC1H470J	T	15.7/13.5
C716	4030016790	S.CER ECJ0EB1C103K	T	14.7/13.5
C718	4030017460	S.CER ECJ0EB1E102K	B	18/5.1
C719	4030017460	S.CER ECJ0EB1E102K	T	13.7/13.5
C720	4030017680	S.CER ECJ0EC1H820J	B	19/8.4
C722	4030017460	S.CER ECJ0EB1E102K	B	12.9/12.9
C723	4030017460	S.CER ECJ0EB1E102K	B	10.9/10.4
C724	4030017460	S.CER ECJ0EB1E102K	B	8.3/16
C725	4030017460	S.CER ECJ0EB1E102K	T	2.3/14.2
C727	4030017420	S.CER ECJ0EC1H470J	T	3.8/13
C728	4030017380	S.CER ECJ0EC1H050B	T	1.3/11.7
C729	4030017430	S.CER ECJ0EC1H101J	B	11.6/12.2
C731	4030017640	S.CER ECJ0EC1H150J	T	3.2/7.7
C732	4030017460	S.CER ECJ0EB1E102K	T	9.9/19.9
C733	4030017420	S.CER ECJ0EC1H470J	T	9.9/20.9
C734	4030018120	S.CER ECJ0EC1H110J	T	16.8/2.3
C742	4030017460	S.CER ECJ0EB1E102K	T	34.1/14.2
C744	4030017640	S.CER ECJ0EC1H150J	T	31.6/16.9
C745	4030017550	S.CER ECJ0EC1H1R5B	T	35.7/15.4
C746	4030017410	S.CER ECJ0EC1H240J	T	31.3/18.4
C748	4030017420	S.CER ECJ0EC1H470J	B	14.2/12.5
C750	4030018120	S.CER ECJ0EC1H110J	B	31.8/15.4
C751	4030017390	S.CER ECJ0EC1H180J	B	31.5/16.8
C752	4030017460	S.CER ECJ0EB1E102K	B	26.7/17.9
C753	4030017460	S.CER ECJ0EB1E102K	B	26.9/15.9
C754	4030017460	S.CER ECJ0EB1E102K	B	29.9/14.2
C755	4030017420	S.CER ECJ0EC1H470J	B	16.7/12.9
C756	4030017420	S.CER ECJ0EC1H470J	B	15.7/12.9
C757	4030017460	S.CER ECJ0EB1E102K	T	16.7/13.5
C758	4030017420	S.CER ECJ0EC1H470J	T	15.8/2.3
C759	4030017460	S.CER ECJ0EB1E102K	T	14.8/2.3
C760	4030017460	S.CER ECJ0EB1E102K	T	6.1/9.4
C761	4030017460	S.CER ECJ0EB1E102K	T	5.2/11.7
C763	4030016790	S.CER ECJ0EB1C103K	T	1.3/14.2
C767	4030017460	S.CER ECJ0EB1E102K	B	16.7/14.5
C768	4030017520	S.CER ECJ0EC1H0R3B	T	29.4/15.8
C769	4030017520	S.CER ECJ0EC1H0R3B	B	34.5/16.7
J701	6510024391	S.CNR IMSA-6176S-03Y902	B	6.3/9.7
J702	6910015891	CNR 9230B-1-02Z140-PT1		
F701	5210000901	S.FUS 0467003.NR (0434003)	B	10.9/19.6
EP711	6910015370	S.BEA ACZ1005Y-102-T	T	1.7/12.9

M.=Mounted side (T: Mounted on the Top side, B: Mounted on the Bottom side)
S.=Surface mount

[FUSE UNIT]

REF NO.	ORDER NO.	DESCRIPTION	M.	H/V LOCATION
L901	6200006190	S.COL BLM21PG300SN1D	T	10.2/6
C901	4030017460	S.CER ECJ0EB1E102K	T	6/6.6
J901	6910015881	CNR 9230B-1-02Z141-PT1		

[ANT UNIT]

REF NO.	ORDER NO.	DESCRIPTION	M.	H/V LOCATION
L801	6200012780	S.COL 0.30-1.4-6TL 27.2N	T	5.7/12.4
L802	6200012470	S.COL 0.30-1.7-7TL 45.3N	T	6.6/9
R801	7030005080	S.RES ERJ2GEJ 823 X (82 k)	T	3.2/14.1
C801	4030017460	S.CER ECJ0EB1E102K	T	10/7
C802	4030017380	S.CER ECJ0EC1H050B	T	6.5/7.1
C803	4030017410	S.CER ECJ0EC1H240J	T	3.2/10.6
C807	4030017620	S.CER ECJ0EC1H100C	T	4/11.9

M.=Mounted side (T: Mounted on the Top side, B: Mounted on the Bottom side)
S.=Surface mount

SECTION 8 MECHANICAL PARTS

[CHASSIS PARTS]

REF NO.	ORDER NO.	DESCRIPTION	QTY.
J1	6910015910	ANT CONNECTOR 104	1
J2	6910015860	IMSA-6277S-O2A-G	1
SP1	2510001061	K036NA500-67	1
W1	8900009640	OPC-963	1
MP1	8010019454	2721 CHASSIS-4	1
MP2	8210020531	2721 T-FRONT PANEL-1 [10-KEY]	1
	8210020731	2721 S-FRONT PANEL-1 [4-KEY]	1
	8210022161	2721 S-FRONT PANEL (B)-1 [SWE-07]	1
	8210022151	2721 S-FRONT PANEL (A)-1 [NOR-08]	1
	8210023051	2721 S-FRONT PANEL (C)-1 [SWE-09]	1
MP3	8210020540	2721 PTT PANEL [others]	1
	8210022140	2721 PTT PANEL (B) [SWE-07]	1
	8210022170	2721 PTT PANEL (A) [NOR-08]	1
	8210022170	2721 PTT PANEL (A) [SWE-09]	1
MP4	8930061780	2721 PTT BUTTON	1
MP5	8930061800	2721 PTT RUBBER	1
MP6	8930040390	Speaker net (B)	1
MP7	8930046050	Speaker net (C)	1
MP8	8210020550	2721 REAR PANEL	1
MP9	8310060760	2721 WINDOW PLATE	1
MP10	8930065750	2721 A-WINDOW SHEET	1
MP12	8930061790	2721 KEYBOARD [10-KEY]	1
	8930062760	2721 4-KEY [4-KEY]	1
	8930067350	2721 4-KEY (A) [SWE-07]	1
	8930067350	2721 4-KEY (A) [NOR-08]	1
	8930067350	2721 4-KEY (A) [SWE-09]	1
MP13	8930061710	2721 MAIN SEAL	1
MP14	8930063060	2721 T-RUBBER	1
MP16	8930064661	2721 SIDE PLATE (A)-1	1
MP17	8930061860	2721 TOP PLATE	1
MP20	8930061880	2721 MIC SPONGE	1
MP21	8930059360	2600 RELEASE BUTTON	1
MP22	8930063030	2721 RELEASE PLATE	1
MP23	8610007510	knob spring NO.7800	1
MP24	8610007920	knob spring NO.1500	1
MP25	8830001720	2721 ANT NUT	1
MP26	8810009221	Screw BT B0 2X8 NI-ZK3 (BT)	2
MP27	8810009561	Screw BT B0 2X6 NI-ZK3 (BT)	2
MP28	8810008971	0-tap 1flat washerB0 2X3.5NI-ZC3 (BT)	11
MP29	8610011930	KNOB N-318	1
MP30	8610012130	KNOB N-323	1
MP31	8810010430	screw truss M3X5 SUS SSBC	1
MP32	8930063052	2721 PLATE-2	1
MP33	8930046020	1123 SHEET (A)-1	1
MP34	8930056540	Push spring (AH)	2
MP35	8830001701	VR NUT (Q)-1	1
MP36	8830001690	VR NUT (R)	1
MP37	8510016360	2721 MAIN SHIELD	1
MP38	8510016350	2721 ANT PLATE	1
MP42	8930062960	WHITE SHEET (R)	1
MP47	8930048870	2056 A-SPONGE	1

[MAIN UNIT]

REF NO.	ORDER NO.	DESCRIPTION	QTY.
J2	6450002250	HSJ1456-010320	1
J3	6450001680	HSJ1122-010010	1
J4*	6510021901	BM02B-ASRS-TF (LF) (SN)	1
J5*	6510018430	AXN330C038	1
J6*	6510024391	IMSA-6176S-03Y902	1
DS3	5030003050	S11188	1
MC1	7700002760	EM6027P-46C33-G-01	1
S1*	2230001060	EVQ-PUL 02K	1
S2*	2260002840	SKHLLFA010	1
S3*	2260002800	SW-167 (SKQT)	1
S4*	2260002800	SW-167 (SKQT)	1
S5*	2260002800	SW-167 (SKQT)	1
S27	2250000180	EC10SP16-47	1
EP7	8930063020	SRCN-2721-SP-N-W	2
MP1*	8510016130	2721 VCO CASE	1
MP2	8510016120	2721 VCO COVER	1
MP3	8930061890	2721 LCD HOLDER	1
MP4	8210020570	2721 REFLECTOR	1

[FUSE UNIT]

REF NO.	ORDER NO.	DESCRIPTION	QTY.
J901	6910015881	9230B-1-02Z141-PT1	1

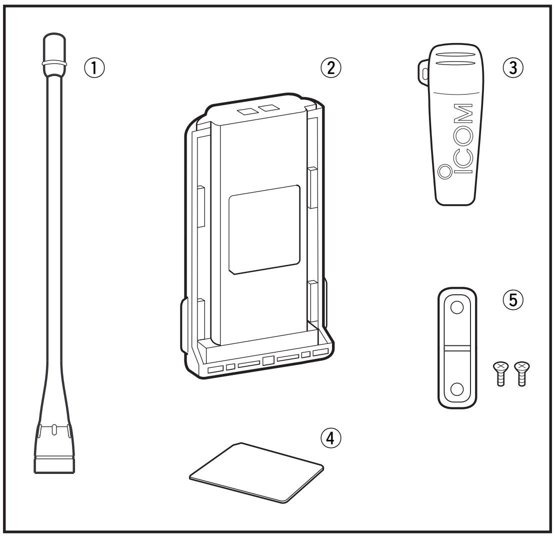
[PA UNIT]

REF NO.	ORDER NO.	DESCRIPTION	QTY.
J701*	6510024391	IMSA-6176S-03Y902	1
J702	6910015891	9230B-1-02Z140-PT1	1
F701*	5210000901	0467003.NR	1
MP701*	8410002370	2337 PA HEATSINK	1

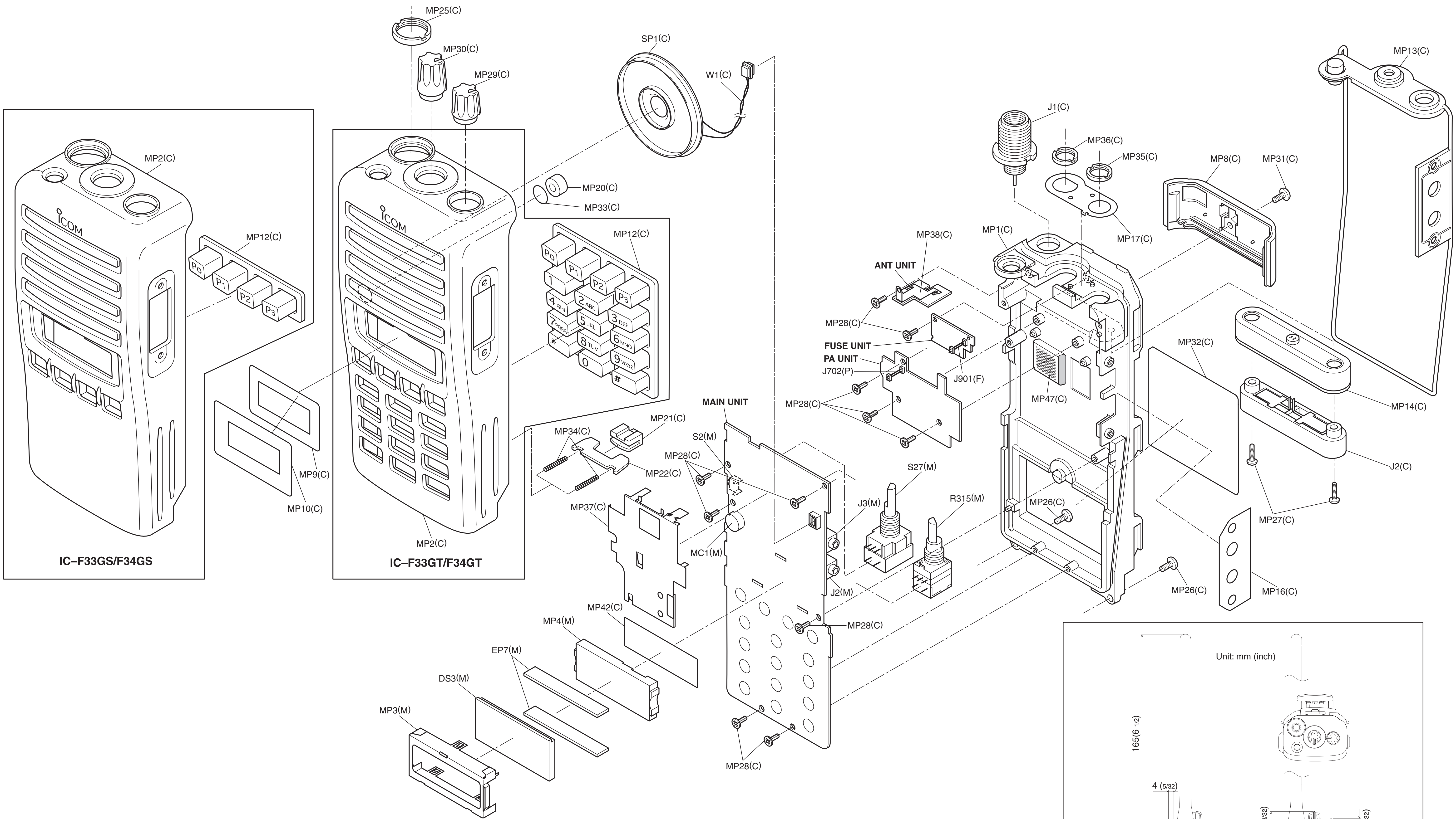
[ACCESSORIES]

REF NO.	ORDER NO.	DESCRIPTION	QTY.
EP1 ①	Option	FA-SC55V-1	1
EP2 ②	Option	BP-230N [USA-01]	1
	Option	BP-232N [others]	1
MP1 ③	Option	MB-94	1
MP3 ⑤	8210020560	2721 JACK PANEL [others]	1
	8210022310	2721 JACK PANEL (B) [SWE-07]	1
	8210022290	2721 JACK PANEL (A) [NOR-08]	1
	8210022290	2721 JACK PANEL (A) [SWE-09]	1
MP4 ⑤	8810004861	Screw PH M2X6 ZK3	2
MP5 ④	8930063052	2721 PLATE-2	1

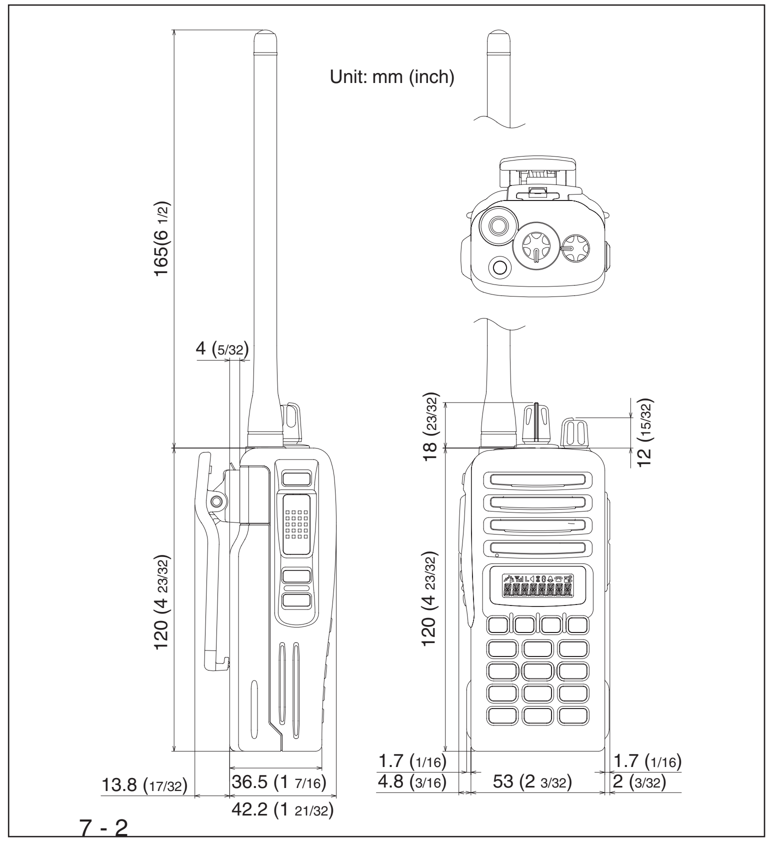
*: Refer to SECTION 10 “BOARD LAYOUTS.”
†: Optional product



Screw abbreviations A, B0, BT: Self-tapping PH: Pan head ZK: Black NI-ZU: Nickel-Zinc SUS: Stainless

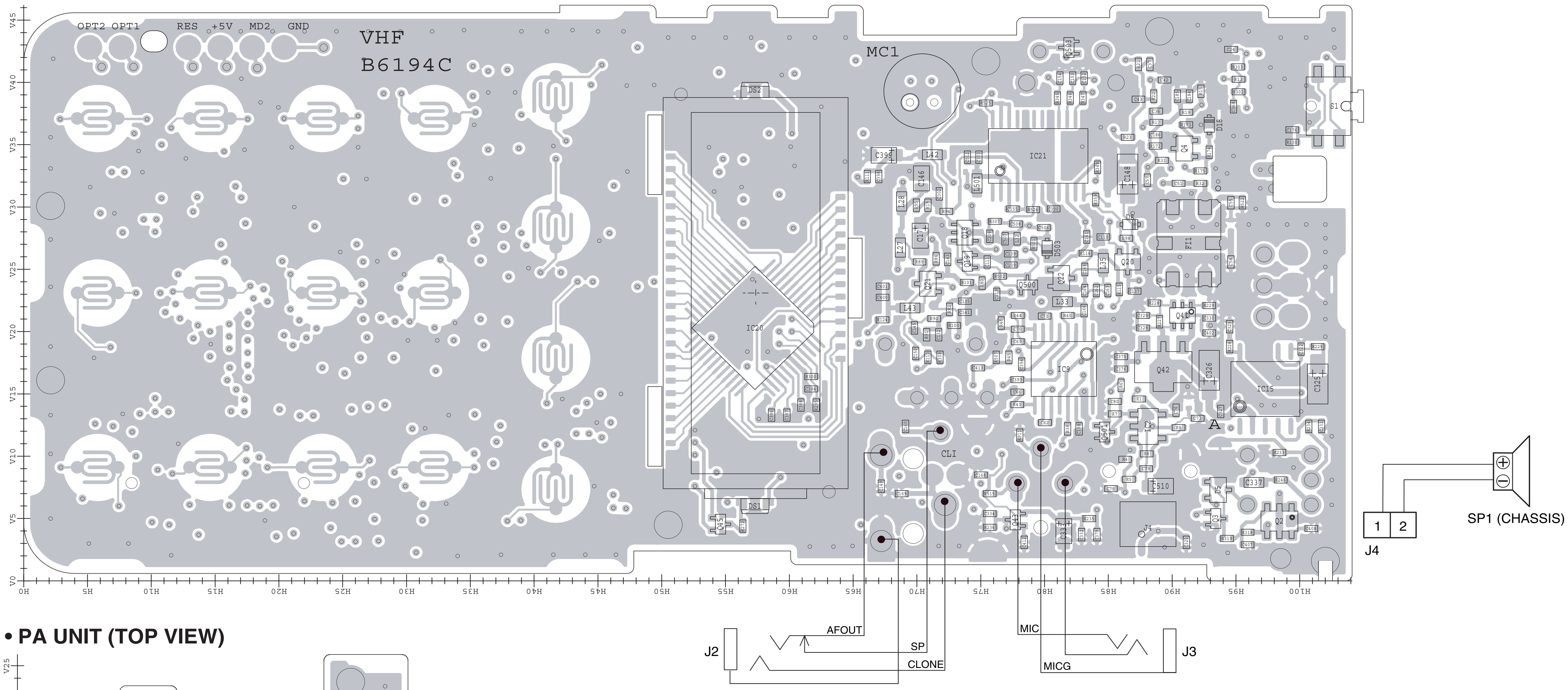


MP25(C)
MP30(C)
MP29(C)
SP1(C)
W1(C)
MP13(C)
MP2(C)
MP12(C)
MP20(C)
MP33(C)
MP12(C)
J1(C)
MP36(C)
MP35(C)
MP8(C)
MP31(C)
MP17(C)
MP38(C)
MP1(C)
ANT UNIT
MP28(C)
FUSE UNIT
PA UNIT
J702(P)
J901(F)
MP32(C)
MP47(C)
MP14(C)
MP28(C)
MAIN UNIT
MP21(C)
MP34(C)
S2(M)
MP28(C)
MP22(C)
S27(M)
R315(M)
J2(C)
MP9(C)
MP10(C)
MP2(C)
IC–F33GS/F34GS
IC–F33GT/F34GT
MP37(C)
MC1(M)
J3(M)
MP26(C)
MP27(C)
J2(M)
MP26(C)
MP16(C)
MP42(C)
MP28(C)
MP4(M)
EP7(M)
DS3(M)
MP3(M)
MP28(C)

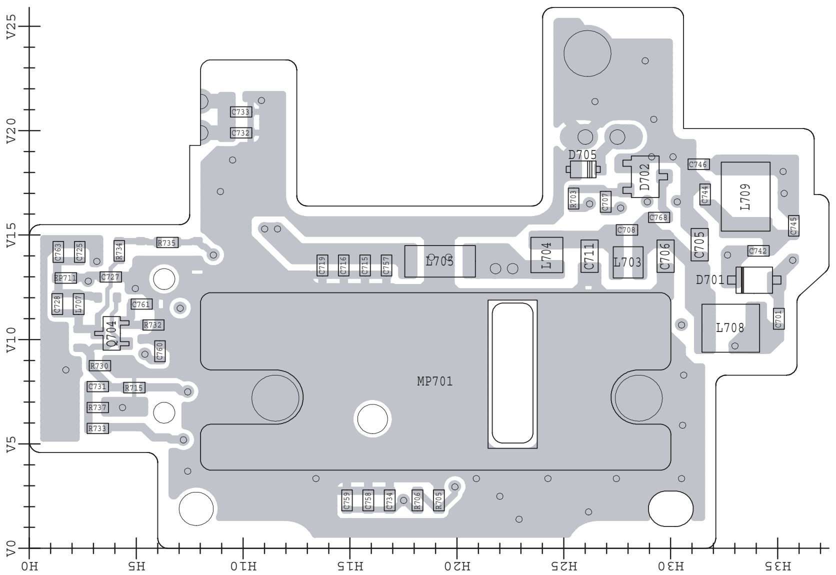


Unit: mm (inch)
165(6 1/2)
4 (5/32)
18 (23/32)
12 (15/32)
120 (4 23/32)
120 (4 23/32)
1.7 (1/16)
4.8 (3/16)
53 (2 3/32)
1.7 (1/16)
2 (3/32)
13.8 (17/32)
36.5 (1 7/16)
42.2 (1 21/32)

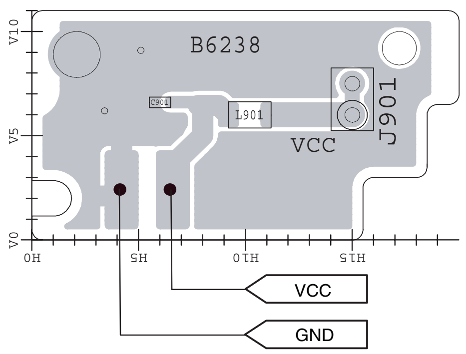
• MAIN UNIT (TOP VIEW)



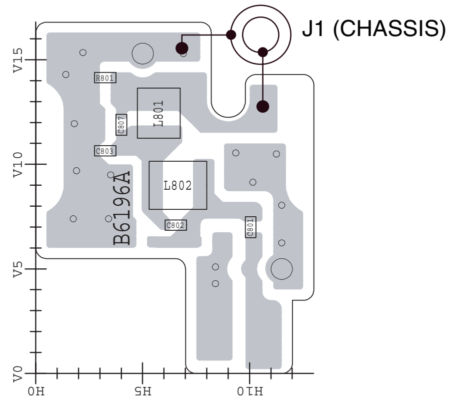
• PA UNIT (TOP VIEW)



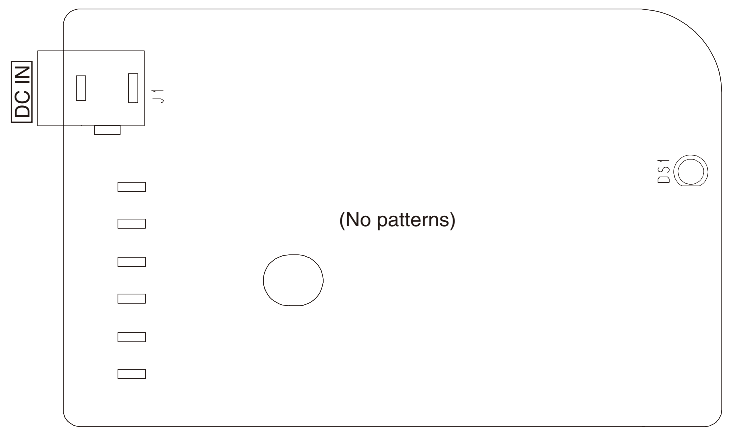
• FUSE UNIT (TOP VIEW)



• ANT UNIT (TOP VIEW)

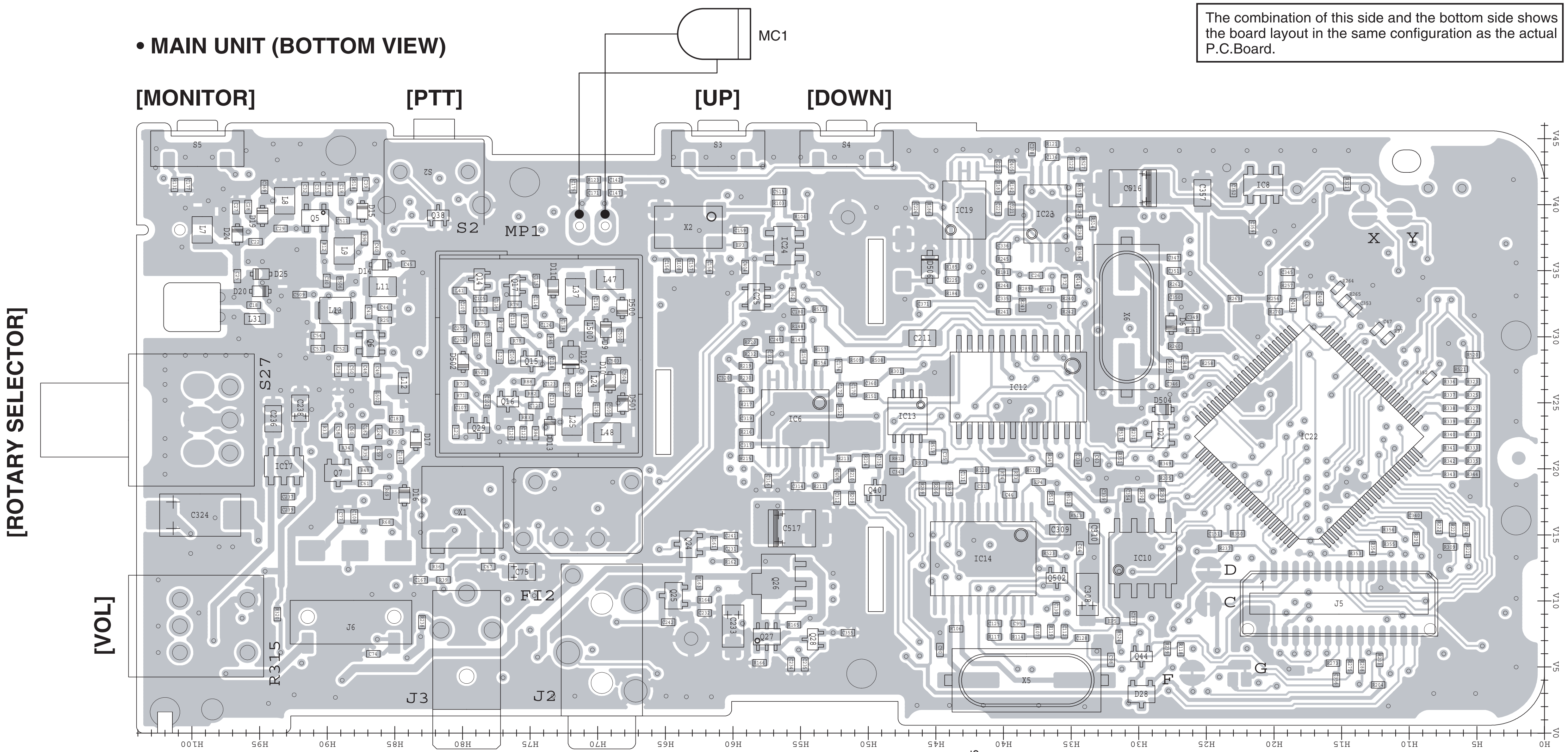


• BC-160 (TOP VIEW)



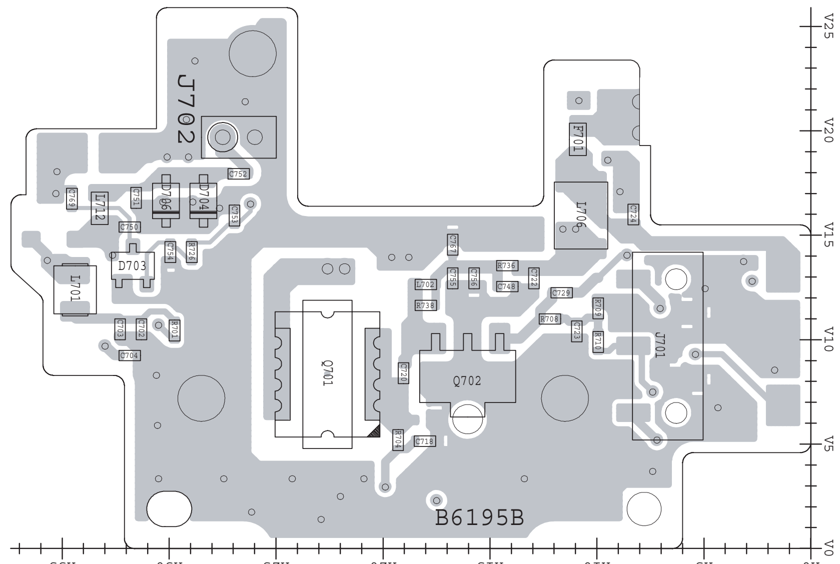
The combination of this side and the bottom side shows the board layout in the same configuration as the actual P.C.Board.

• MAIN UNIT (BOTTOM VIEW)

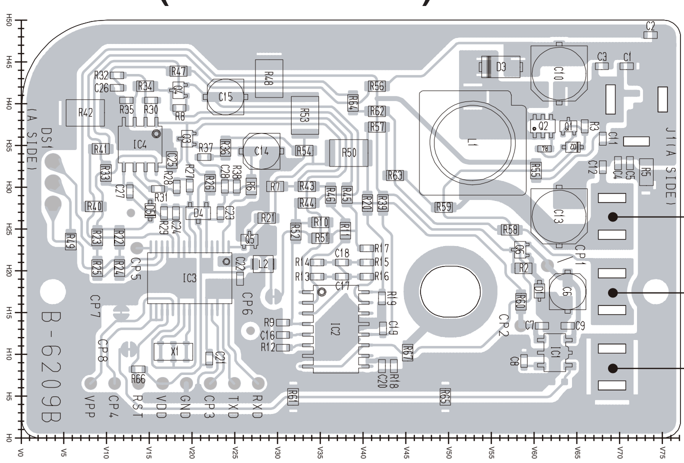


J5 pin	Signal	Pin	Signal
1	PTTIN	30	GND
	PTTOUT		+5V
	MICOUT		VCC
	MICIN		MICMUTE
	AUX		AFONOP
	BUSY		BEEPOUT
	MDWN		RXMUTE
	SIGOUT		DISCIN
	OPT1		AFOUT
	OPT2		REM
	OPT3		CCS
	GND		CIRQ
	OPV3		SO
	OPV2		SI
15	OPV1	16	SCK

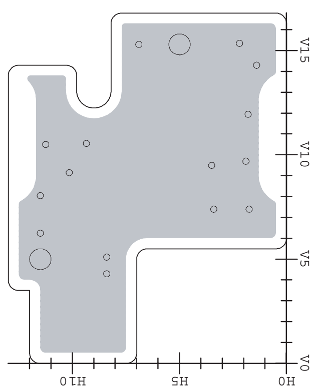
• PA UNIT (BOTTOM VIEW)



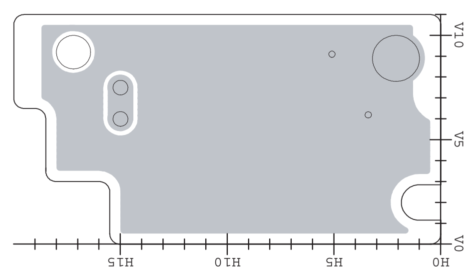
• BC-160 (BOTTOM VIEW)

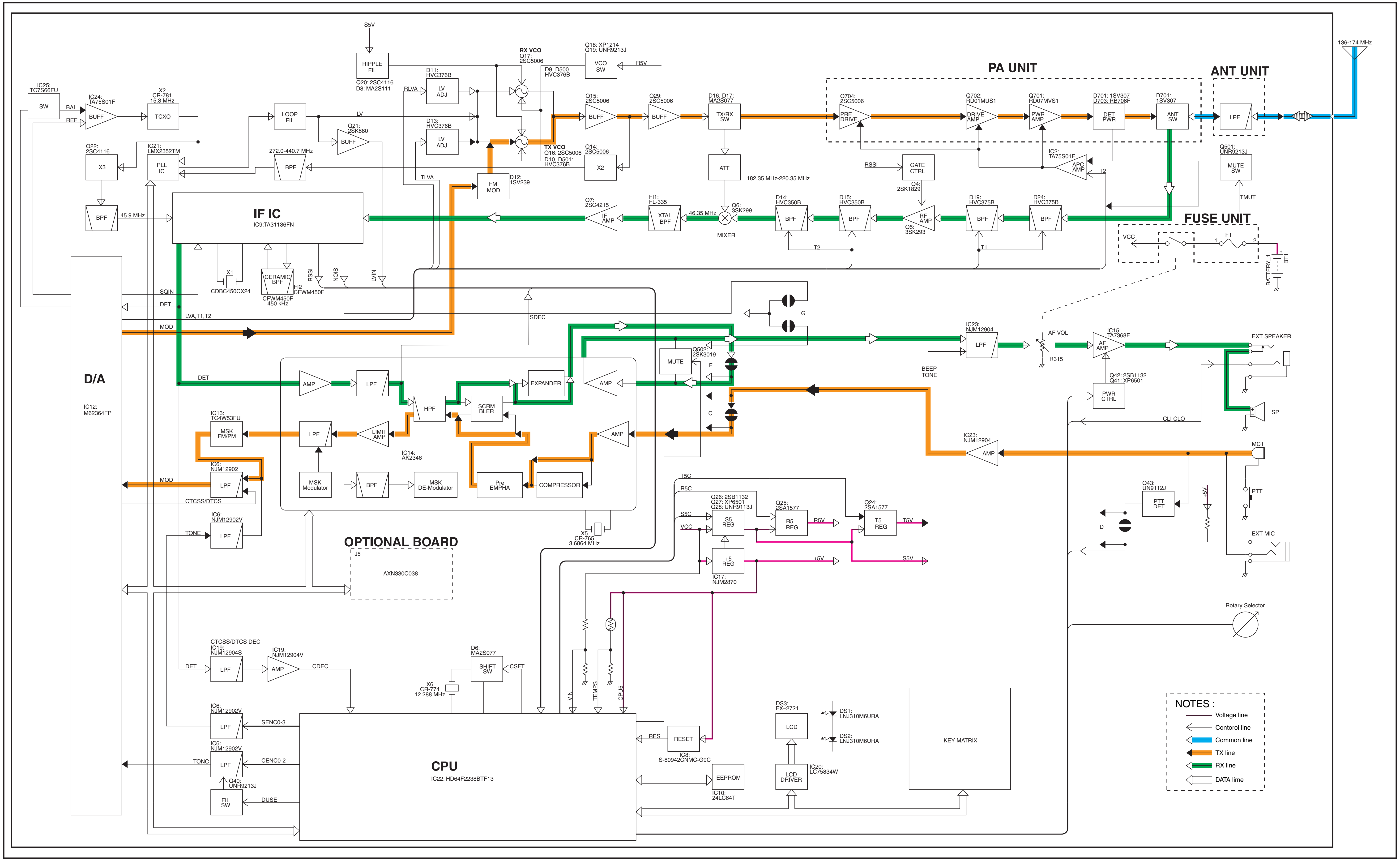


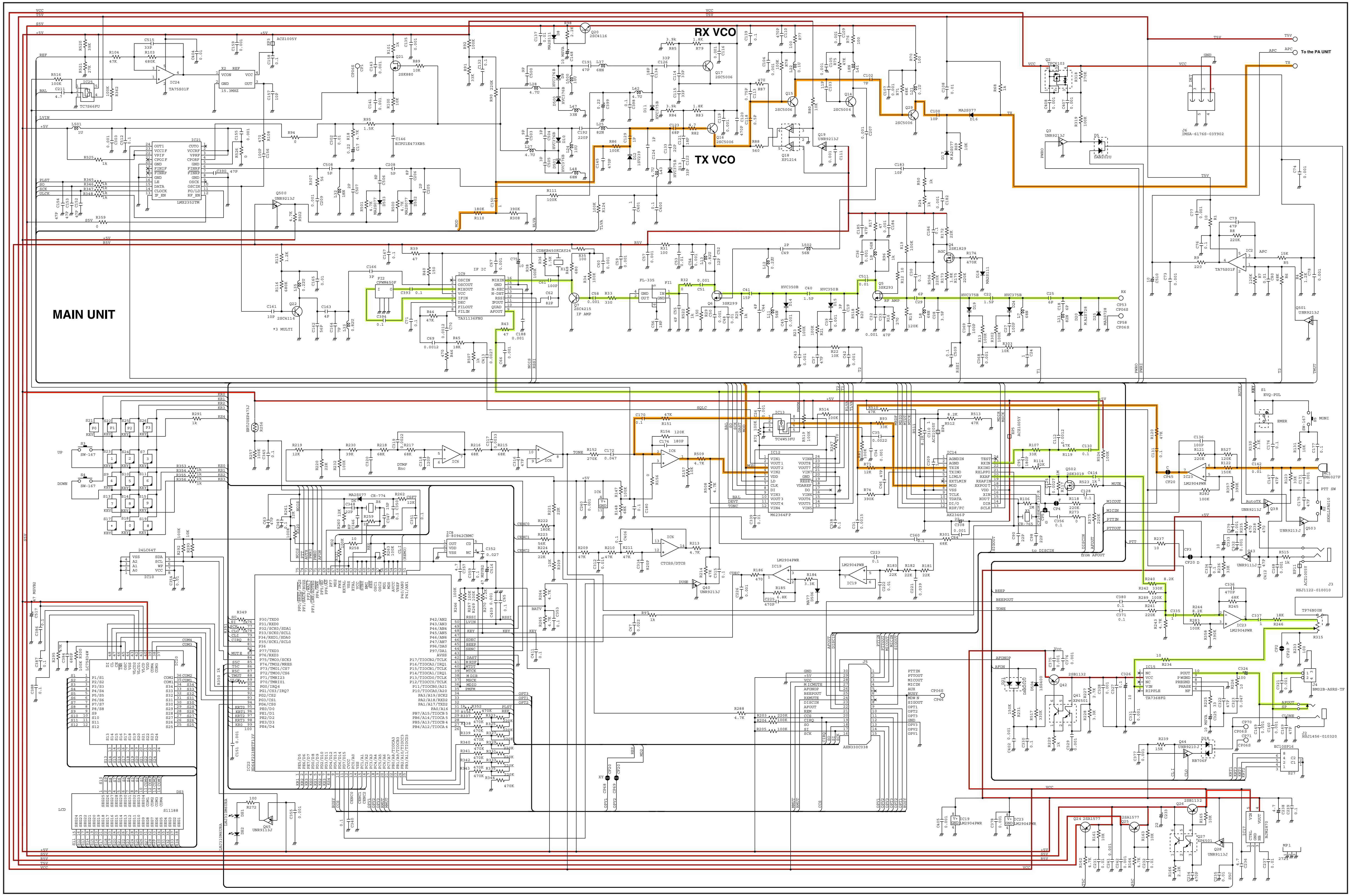
• ANT UNIT (BOTTOM VIEW)



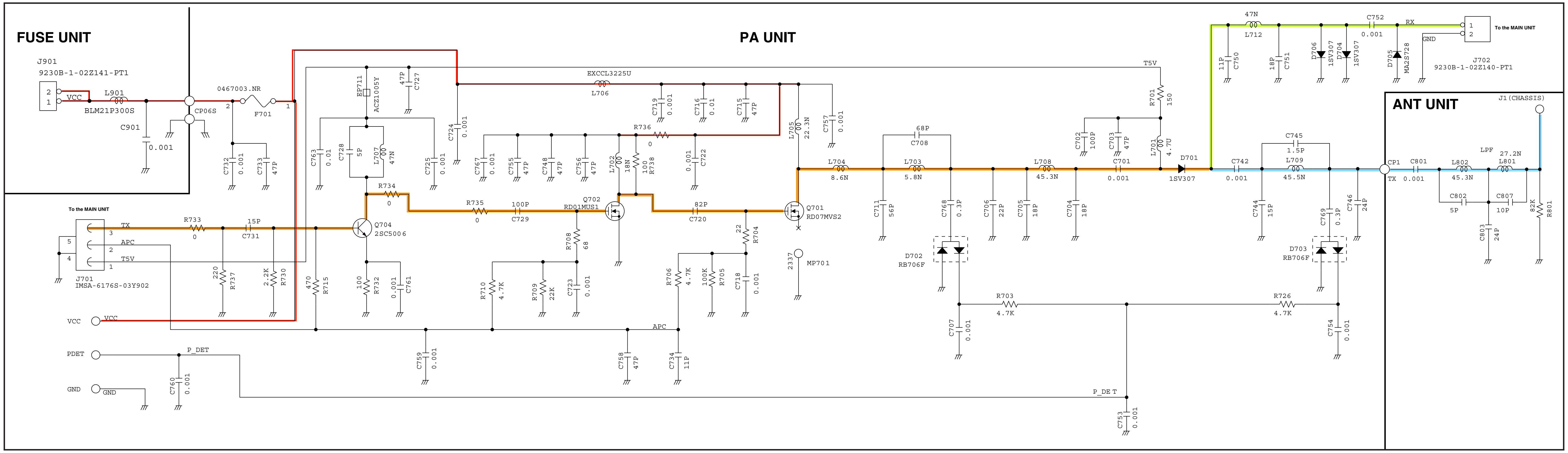
• FUSE UNIT (BOTTOM VIEW)




PA UNIT
ANT UNIT
FUSE UNIT
IF IC
IC9:TA31136FN
D/A
IC12: M62364FP
CPU
IC22: HD64F2238BTF13
OPTIONAL BOARD
J5
AXN330C038
136-174 MHz
RIPPLE FIL
VCO SW
RX VCO
TX VCO
LOOP FIL
TCXO
BUFF
PLL IC
X3
BPF
FM MOD
ATT
MIXER
TX/RX SW
PRE DRIVE
DRIVE AMP
PWR AMP
DET PWR
ANT SW
LPF
GATE CTRL
APC AMP
MUTE SW
RF AMP
IF AMP
XTAL BPF
CERAMIC BPF
AMP
HPF
SCRM BLER
EXPANDER
LIMIT AMP
MSK Modulator
MSK DE-Modulator
Pre EMPHA
COMPRESSOR
MSK FM/PM
MUTE
AF VOL
AF AMP
PWR CTRL
EXT SPEAKER
SP
MC1
PTT
PTT DET
EXT MIC
S5 REG
R5 REG
T5 REG
+5 REG
SHIFT SW
FIL SW
RESET
EEPROM
LCD
LCD DRIVER
KEY MATRIX
Rotary Selector
NOTES :
Voltage line
Contorol line
Common line
TX line
RX line
DATA lime



*; Refer to "PARTS LIST."


FUSE UNIT
J901
9230B-1-02Z141-PT1
VCC
L901
BLM21P300S
C901
0.001
CP06S
0467003.NR
F701
PA UNIT
EP711
ACZ1005Y
47P
C727
EXCCL3225U
L706
C719
0.001
C716
0.01
C715
47P
T5V
R701
150
C724
0.001
C763
0.01
C728
5P
L707
47N
C725
0.001
C732
0.001
C733
47P
R736
0
C767
0.001
C755
47P
C748
47P
C756
47P
L702
18N
R738
100
C722
0.001
L705
22.3N
C757
0.001
68P
C708
C702
100P
C703
47P
L701
4.7U
D701
1SV307
To the MAIN UNIT
R733
0
15P
C731
R734
0
R735
0
100P
C729
Q702
RD01MUS1
82P
C720
Q701
RD07MVS2
L704
8.6N
L703
5.8N
L708
45.3N
C701
0.001
Q704
2SC5006
R708
68
R704
22
MP701
2337
C711
56P
C768
0.3P
C706
22P
C705
18P
C704
18P
D702
RB706F
J701
IMSA-6176S-03Y902
TX
APC
T5V
R737
220
R730
2.2K
R715
470
R732
100
C761
0.001
R710
4.7K
R709
22K
C723
0.001
R706
4.7K
R705
100K
C718
0.001
R703
4.7K
R726
4.7K
C707
0.001
C754
0.001
VCC
PDET
GND
P_DET
C760
0.001
C759
0.001
C758
47P
APC
C734
11P
P_DET
C753
0.001
47N
L712
C752
0.001
RX
J702
9230B-1-02Z140-PT1
GND
C750
11P
C751
18P
D706
1SV307
D704
1SV307
D705
MA2S728
ANT UNIT
J1 (CHASSIS)
C745
1.5P
C742
0.001
L709
45.5N
C744
15P
C769
0.3P
C746
24P
D703
RB706F
CP1
TX
C801
0.001
LPF
L802
45.3N
L801
27.2N
C802
5P
C807
10P
C803
24P
R801
82K

[CHASSIS PARTS]

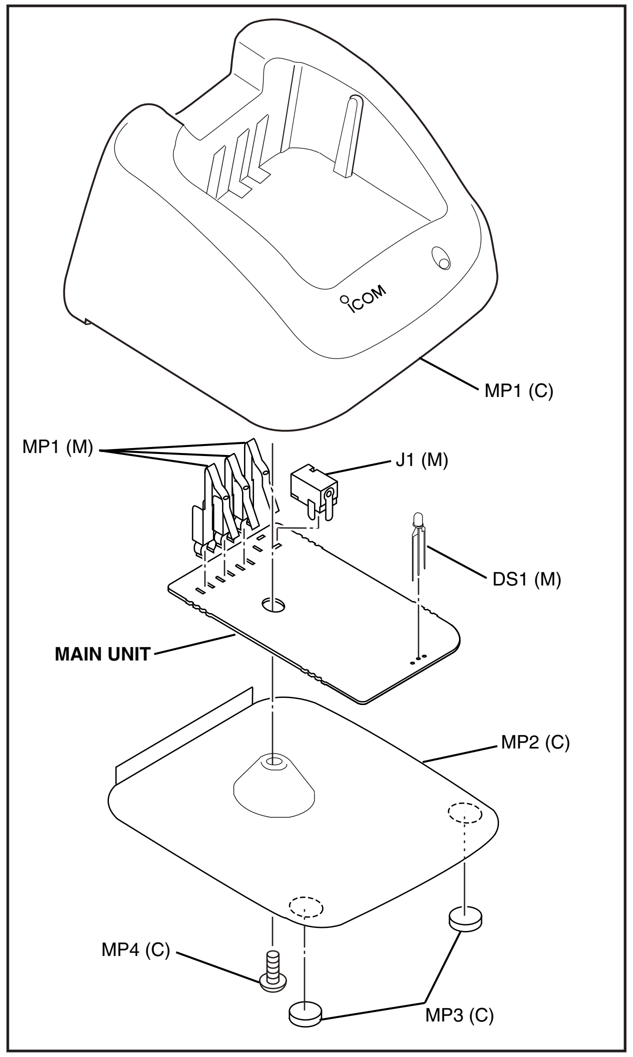
REF. NO.	ORDER NO.	DESCRIPTION	QTY.
MP1	8010019750	2830 case	1
MP2	8110008220	2830 cover	1
MP3	8930039620	Leg cushion (A)	2
MP4	8810008630	Screw PH BT M3 × 6 NI-ZU	1

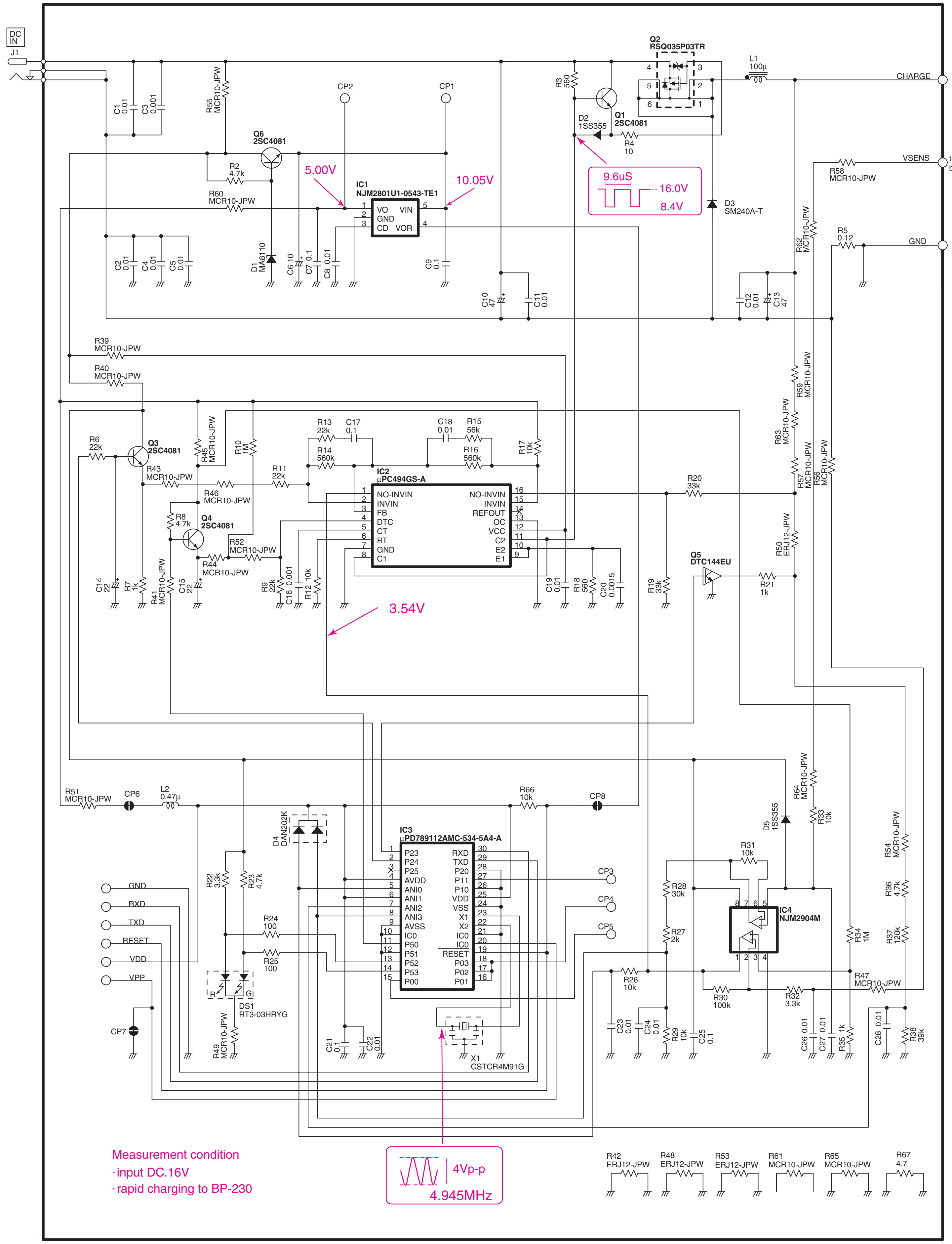
[MAIN UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	QTY.
J1	6510023070	Connector HEC2305-01-250	1
DS1	5040002740	LED RT3-03HRYG	1
MP1	8930064410	2830 TERMINAL	3

[ACCESSORIES]

REF NO.	ORDER NO.	DESCRIPTION		QTY.
EP1	Optional product	Charger BC-145E	[EUR]	1
	Optional product	Charger BC-145UK	[UK]	1





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